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THE

OPHTHALMIC REVIEW

A RECORD OF OPHTHALMIC SCIENCE

EDITED BY

WILLIAM GEORGE SYM, M.D.,
EDINBURGH.

WITH THE ASSISTANCE OF

J. B. LAWFORD — LONDON
KARL GROSSMANN, M.D. — LIVERPOOL
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CHARLES H. USHER, M.B. — ABERDEEN
EDWARD JACKSON, M.D. — DENVER, COL.

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EPICANTHUS.[1]

BY GEO. FOGGIN, B.A.LOND., L.R.C.P. AND S.ED.
LATE ASSISTANT SURGEON, NEWCASTLE-ON-TYNE EYE INFIRMARY.

IT is not my purpose to enter at length into any discussion upon the ætiology of epicanthus, but after briefly noting the classification of such cases to suggest methods of treatment for certain of them.

The earliest observer of this condition, Schoen (1828), mistook it for a supernumerary eyelid, a sort of misplaced remnant of a nictitating membrane! and it was not till a few years later that von Ammon correctly appreciated the malformation and christened it with the name it has since borne. It has been my experience, gathered at a time when I used to see a large amount of accoucheur work, that a very considerable number of infants present more or less evidence of redundancy of the skin folds at the inner eye-angles, and the same observation led Manz to regard it as a temporary cantinuance of a fœtal condition. Pinching a fold of skin upon the invariably flat nose-bridge neutralises the overlapping, and as the nasal bones grow the condition imperceptibly disappears; the number of cases in which epicanthus persists and becomes permanent is exceedingly small. Hence we may classify congenital epicanthus as—

(*a*) Transient or temporary.
(*b*) Persistent or permanent.

It has been customary to enumerate among the

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[1] Read in the Section of Ophthalmology at the Meeting in Ipswich of the British Medical Association, 1900.

Ophth. Review. Vol. XX., No. 231, January, 1901

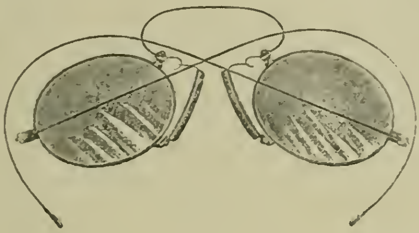
causes, incomplete development of the frontal sinuses, undue separation of the orbital cavities, &c., but undoubtedly the main factor is in my own experience incomplete development of the nasal bones, though, at the same time, unusual tightness of the cheek tissues may also sometimes be blamed. A few weeks ago a boy, aged 14, was brought to me with well marked double epicanthus and a well formed "Roman" nose with prominent bridge. The usual plan of pinching the skin of the nose-bridge caused the overlapping to disappear, but the same effect could just as easily be produced by gently pressing upwards and inwards the tissues of each cheek from the superior maxillæ towards the inner canthi. Experimentally one may easily produce a partial epicanthus in one's own case, by pressing the fingers in a downward and outward direction on the facial aspect of the superior maxilla. How far may this tightness account in other cases for failure of the vomer to assert itself?

We may also meet with acquired epicanthus, where the condition has supervened upon necrosis, specific or otherwise, of the nasal bones; or, if unilateral, it may have been due to cicatricial bands following burns, scalds or destructive blepharitis. In addition a spurious or simulated epicanthus has been noted in forms of conjunctivitis associated with much swelling of the inner canthus.

The cases which I wish specially to note are those (1) in which from abnormal flatness of the nose-bridge in early childhood the condition may be regarded as likely to persist, and (2) other congenital cases which after eight years of age or so have every appearance of proving permanent from want of development of the nasal bones.

For the former cases it has been recommended to use a form of spring clip which would gently nip up

the nose-bridge for periods; of this I have had no experience, but to achieve the same end I have used the form of spectacle *pince-nez* shown, correcting, as is often required, the ametropia present, or being plain glass when refraction is normal. Again, it seems to me likely that this method may probably achieve the end desired by neutralising the tightness of the cheek muscles, and taking off from the bridge of the nose a pressure which retards its expansion. It will frequently be noted as bearing out this view, that cases of exaggerated epicanthus which are likely to persist, are associated with an upward wrinkling or contraction of the frontalis muscle over the root of the nose similar to what we find laterally in cases of ptosis and of which the accompanying photograph is an example.



When orthopædic methods fail, and it is agreed that the condition should be relieved by operation, it has been usual to perform that suggested by von Ammon, who pinched up a fold of skin upon the nose-bridge, marked it out in pencil and excised it, stitching the edges of the wound together. A slight modification of this was to pass (de Wecker) two or three curved needles through the tissues, cut off the included fold, and complete by pushing the needles through and tying the sutures. Sichel suggested passing the sutures completely through and then ablating the fold, but it is difficult to avoid injuring the sutures by this method.

It was whilst endeavouring to perform this upon a case five years ago, that the idea occurred to me to pass sutures and tie them tightly to harelip pins, one on each side, thus pinching up a fold of skin upon the bridge of a flat nose. The effect looked neat if only it could be kept so, as the eminence of tissue was sadly wanted. It then occurred to me to pass a Graefe's cataract knife subcutaneously on each side of the nose, detach the tissues as freely as possible from the nose-bridge, and somewhat beyond the extent of the pinched-up fold on either side, pass sutures through, and tie these with the requisite degree of tightness to a short length of leaden style on each side. This I did, but the result of the first attempt was not satisfactory, the swelling and pain which supervened being such that the boy's (age 7) endurance proved unequal to the occasion, and I reluctantly had to remove the sutures. A second case I tried two years ago and this I did in exactly the same way; but instead of tying the sutures (four) to a leaden style on each side, I passed them through a flat piece of lead shaped to each side of the nose, about an inch and a quarter long, tapering from five eighths to half an inch in width, the plates being a little over an eighth of an inch in thickness. These were kept *in situ* for a fortnight, the pain and swelling being somewhat severe for four days—then gradually subsiding. The result has been gratifying. The epicanthus is gone, and seemingly permanently; in place of the flat bridge there is a more natural contour of the nose, and the central unsightly scar of the ordinary operation is of course avoided. There have lately been reported some cases of bone grafting, in one of which a portion of the patient's own fourth metatarsal bone was used. This has been done, however, chiefly in order to replace a necrosed vomer, where of course the conditions are very different to those obtaining in the class to which I have drawn attention. With so limited an experience of this subcutaneous method it would ill become me to do more than venture to suggest it for further trial and experiment in those cases in which we have reason to expect persistence of a congenital epicanthus with flat nose-bridge.

REVIEWS.

ROHMER (Nancy). Symmetrical Angio-megaly of the Upper Lids. *Arch. d'Ophtalmol., August*, 1900.

In this paper, which was read before the International Medical Congress in Paris, Rohmer places on record four examples of the condition designated in the title of his article. This disease, or a condition somewhat resembling it, had been previously described under other names by von Ammon, Sichel and Mackenzie. In more recent years Fuchs, Fehr and Schmidt-Rimpler have each reported one example. Rohmer states that, as far as his knowledge extends, the cases published by Fuchs, Fehr, Schmidt-Rimpler and himself comprise the bibliography of the subject.

This malady is characterised by an increase in the volume of the skin of the upper lids in their whole length. This excess of skin, which is flaccid, slightly red and folded, falls over the free edge of the eyelid which it hides, and in some cases obstructs vision, as does the drooping lid in ptosis. The muscles of the eyelid retain their power unimpaired, but when the elevator palpebræ contracts the free margin of the tarsus is drawn up behind the loose overhanging skin. The appearance of the skin does not suggest swelling, nor the presence of a new growth or of fluid behind it, but merely that there is an excess of cutaneous tissue. Palpation seems to confirm this; the skin can be picked up in a large fold and feels thin and as though there was an empty space posterior to it. This condition of the eyelids progresses up to a certain stage and then seems to become stationary. In some instances little or no alteration may take place during many years (author's case 4).

In all Rohmer's patients a noticeable feature was a temporary swelling and increased vascularity of the eyelids during emotional excitement, and in one patient, a young girl, a fit of crying caused the lids to become greatly enlarged and very red. This symptom, which the author considers to have a vascular origin, does not seem to have attracted the attention of former observers.

All the recorded cases have occurred in females, and the disease has appeared in childhood or early adolescence. No assignable cause has been discovered ; in one instance a similar condition had existed in the patient's mother.

The pathogenesis of this affection is very obscure. Fuchs and Fehr thought that recurrent attacks of œdema of the eyelids led to distension of the skin, which subsequently became atrophic. Schmidt-Rimpler considered there was a hernia of the orbital fat through the orbicularis and subjacent aponeurosis. Rohmer thinks the most likely explanation is that of a developmental and functional anomaly of the vascular system of the lids, which results in trophic changes in the skin. He gives in detail his reasons for differing in opinion from previous writers, but these need not be repeated in this abstract. In consequence of his views as to the pathogenesis of the disease, he proposes the name symmetrical angio-megaly.

The treatment of this malady consists in free removal of the redundant skin. If, when the skin has been incised, the orbital fat presents, as much of this as necessary should be removed.

The excised portions of skin have been examined microscopically by Schmidt-Rimpler, Fehr and Rohmer. The first-mentioned found no noteworthy change. Fehr, for the purposes of comparison, cut sections of the skin of normal eyelids prepared in the same way. He found the skin from his patient's lids exhibited a notable atrophy of all its layers. The papillæ of the Malpighian layer had wholly disappeared or were much flattened. The subcutaneous cellular tissue was loose and friable. Everywhere the skin and subcutaneous tissue showed numbers of dilated blood-vessels in section, filled with red corpuscles. By suitable staining elastic fibres were shown to be present in large numbers, but were for the most part thinner than usual and formed a network, the meshes of which were larger than in the normal skin. Rohmer examined portions of the skin removed from two of his patients; in one he found a dilatation and overgrowth of lymphatics, and alongside these sections of large arterial and venous channels filled with blood. These blood-vessels were present in the skin and also in the subcutaneous cellular tissue. The number of these vessels did not seem so abnormal as did their calibre. In other respects the skin did not appear altered except in respect of its thickness, which was reduced. In the other specimen Rohmer found a similar dilated condition of arteries and veins, but no appreciable alteration in the lymphatics. No unusual amount of elastic tissues was present.

J. B. L.

DOMELA - NIEUWENHUIS (Zürich). Krönlein's Operation.[1] *Beiträge zur Klinischen Chirurgie, Tübingen*, ii. and iii., 1900.

VALUDE (Paris). Krönlein's Operation. *Annales d'Oculistique, August*, 1900.

Every ophthalmic surgeon who has had the unpleasant duty of clearing out a tumour from the apex of the orbit must have felt the difficulty and inconvenience of working in a cavity so vascular and so confined, and with the whole field of operation so dark and so difficult of access, and obscured with blood every moment. This inconvenience and this difficulty are bad enough under ordinary conditions, but they are intensified when an attempt is made to remove the tumour and yet to leave the eye. Yet the ophthalmic surgeon is apt to shrink from an operation involving the bony parts of skull and face, and many a patient who retains good vision though there is a tumour at the apex of the orbit, is simply permitted to remain as he is until the process has caused the loss of the eye, before the surgeon will consent to step in; the eye being then blind, no effort is made to preserve it, and the whole contents of the orbit are cleared out. This is, in Valude's opinion, a pity, for the danger involved in Krönlein's operation is but small, while it affords so good a view of the structures in the orbit. This operation is apt to be regarded somewhat doubtfully by ophthalmic surgeons, and precious time to be lost. None of the methods of obtaining access to the orbit from the front by tenotomy of one or other of the muscles, however, compares at all with Krönlein's plan in regard to efficacy, while in them the globe is apt to be so "knocked about" in the attempt, that its integrity is almost sure to be lost. Valude, who says the operation is too much neglected in France, has found it to be not difficult of performance, and to afford so great convenience in the removal of tissue from the orbit that he is disposed to perform it in any case in which he requires access to the apex, even if he should have already decided to remove the eye as a preliminary step.

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[1] See also OPHTHALMIC REVIEW, 1900, p. 289.

The paper by Domela-Nieuwenhuis, which reaches enormous dimensions, for it extends to nearly 150 pages, is devoted to a careful consideration of the different modes by which access may be, and has been, obtained to the posterior parts of the orbit, the reasons for preferring Krönlein's to any other procedure, the precise steps in the operation, the indications for its performance, the difficulties to be encountered, the results, and in fact, every point connected with the retrobulbar surgery of the orbit. It will be found a mine of information on this topic by any one who wishes to enquire into the subject, including as it does fairly full accounts of all published cases in which this particular operation has been performed.

The author—who, it may be mentioned, possesses an English qualification—begins by discussing the necessity for such a mode of entrance into the orbit, and comparison of other procedures which have from time to time been suggested. There are, he points out, air-containing cavities on three of the four sides by which the orbit is enclosed with which it is very undesirable to meddle, and it is only on the outer side therefore that one can obtain access without thus breaking into a sinus; this, of course, is a point much in favour of Krönlein's method, supposing that the anterior route is closed to us. As regards the anterior route, all that need be said in the meantime is that it must be quite plain that if any serious and thorough operation is to be carried out at the apex of the orbit, the saving of the globe is, in a large proportion of cases, a practical impossibility. It has been accomplished, some have succeeded in retaining the globe even when removing a tumour which has implicated the nerve, but it is certain that the failures to retain the eye have been far more frequent than the successes; while the severe handling to which the eye must be subjected in the process so interferes with its vitality and mobility that it can only rarely be kept for long in a satisfactory condition, while the difficulty which it causes in thoroughness of treatment almost negatives any attempt. In the laudable desire, then, to obtain free access (from the front) to a deeply-seated tumour or phlegmon, it is probable that many a good, many a fairly good, and many a good-looking, even if blind, eye has been sacrificed, to the great detriment of the patient's appearance, if nothing else.

Other modes of entrance have been proposed: Wagner suggested a plan very similar to that of Krönlein; Cahen (1897) removed part of the upper wall, after taking precautions to keep the brain and dura out of the way of injury, but the operation is very complicated, involving a double invasion of the cranial vault. Besides, it is by no means easy to work in the depths of the orbit, for it does not give either good access or good illumination, and in that situation there is a multitude of tissues of which care must be taken—the lacrimal gland, the levator palpebræ, the superior oblique, certain motor and secretory nerves, &c. Altogether the frontal route is not to be recommended. Gussenbauer proposed and carried out two methods of reaching the deeper parts of the orbit from the inner or nasal side in patients in whom the nasal tissues were implicated ; but this method of access can only be regarded as feasible when such is the case. Also in the case of a tumour growing from the superior maxilla, and sprouting into the orbit, it has been found necessary to enter from below. But neither could this method be regarded as applicable in any large number of cases.

The steps of the operation suggested by Krönlein are as follows : A skin incision is made in a curved line beginning at the ridge of bone (easily felt by the finger) which bounds anteriorly the temporal fossa, about 1 cm. above the orbital margin, curving forwards to have its middle point opposite the outer canthus, and terminating over the zygoma half way between the tragus and the external canthus. One advantage of the incision being thus curved is that when the parts are replaced after the operation the soft parts are subjected to no tension, but fit quite readily. By means of a periosteum elevator the periosteum covering the whole outer wall of the orbit is now eased off its bed, and the point being carefully introduced into the inferior orbital fissure and the handle carried towards the nose, it is completely lifted off. This is not difficult, as it is only at the orbital margin and the sutures that the periosteum is at all firmly adherent. Three bone-sections are now required—two horizontal and one oblique. The first divides the external angular process of the frontal bone close to its base, the next (oblique) runs from the deepest portion of the first behind the suture which joins the malar and sphenoid, and ends in the spheno-maxillary fissure. This is best accomplished by means of a narrow sharp chisel, the orbital contents being kept well out of danger of injury meanwhile. The third passes through the frontal process of the malar, close to its root, and also ends in the spheno-maxillary fissure : it may be made either with a special small saw or with a sharp chisel. In order to have as much space as possible it is well to keep the two straight sections as far apart as may be, and much care should be taken to avoid any unnecessary splintering of the bones, especially during chisel work. For this reason the chisel ought to be both fine and very sharp, and the strokes of the hammer very light. The author devises a special instrument for this purpose, for whose characteristics reference to the original (p. 564) should be made, as well as for advice regarding special saws. The oblique incision must always be made before at least the second of the straight sections, else there is no firm support for the working of the chisel. The dimensions of the piece of bone thus loosened vary considerably with the shape of the particular orbit, but should be about 3 cm. high and 2½ cm. deep—that is, about an inch in depth and rather more than that in height. It is rolled outwards without difficulty about its vertical axis along with the soft parts covering it, thus giving free access to the deeper parts of the orbit. The periosteum is now divided with blunt-pointed scissors from before backwards and turned aside, when the contents of the orbit are clearly seen. Further steps will of course depend on the condition of affairs then discovered, but generally the external rectus is divided close to the sclerotic insertion, and into both ends of it, and of any other muscle which requires division, stitches should be inserted for convenience of subsequent indentification and reposition. At the close of the operation the flap of bone and soft tissue overlying it is replaced, and held in position by a few stitches passing through the periosteum; a drain of tubing or iodoform gauze is left in for a few days; silk is usually employed for the skin wound.

Domela-Nieuwenhuis has been able to trace in the literature of the subject forty-five recorded cases of the performance of this operation, which many of the authors seem to have slightly modified to suit individual conditions; and of all these records he gives at least the essential points, with a number of useful and interesting illustrations of the appearance of certain of the patients. It is perhaps matter for regret that none of these recorded cases are to be found in British journals.[1]

As regards the pathological condition, the cases group themselves thus: five cysts, seven cavernous angiomata, eleven sarcomata (of tissues other than the nerve), five other tumours, two tumours of the nerve sheath and ten of the nerve—in all 40 neoplasms; besides those cases the operation was performed once for diagnostic purposes, once for gun-shot injury, once for pulsating exophthalmos, and twice for orbital phlegmon. From the point of view of the results it may be simply stated that either at the time or later the globe had to be removed in five cases, and that in one the operation was soon followed by the death of the patient, probably from intracranial invasion by the neoplasm. It is certain that as regards the question of retaining the globe subsequently, Krönlein's operation is eminently satisfactory, for in none of the other thirty-eight or thirty-nine cases did phthisis bulbi occur. The wound heals up soundly and quickly, and very little deformity to speak of remains; in certain of the cases there was slight enophthalmos. It is of course manifest that if, owing to its position, a tumour has caused paralysis of a certain muscle, the operation cannot be expected to restore to that muscle its function: special care has to be taken of the external rectus, which is more than any other muscle exposed to injury in the course of the operation. The cornea, too, requires particular attention, for it is almost certain, if the manipulations in the orbit are at all extensive, to be deprived of sensation, and may, therefore, readily be injured, may ulcerate, and slough, but this anæsthesia is rarely more than temporary, since the nerves are, after a little interval, regenerated.[2]

As regards effects upon vision, the investigation is complicated by two circumstances, namely, that vision has often been lost before operation, or at least is more or less rapidly fading, and that it is sometimes necessary to divide the optic nerve in the course of removal of the (nerve) tumour. But in a good proportion of other cases vision was found not to have suffered, and in some to be distinctly improved.

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[1] For a case published more recently see *Montreal Medical Journal*, Oct., 1900.

[2] See Bielli, OPHTHALMIC REVIEW, 1900, p. 97.

The author gives a list of eleven conditions in which Krönlein's operation may be indicated, with brief remarks thereupon. These are:—

(1) Cysts of all sorts, in which the operation is much less dangerous than draining and injection of various substances.

(2) Tumours of the optic nerve and its sheath.

(3) Retrobulbar cavernous angioma and lymphangioma.

(4) Other retrobulbar tumours, osteoma, sarcoma, &c.

(5) Retrobulbar injuries, especially if septic infection has probably or certainly taken place, or if a foreign body is present.

(6) Retrobulbar phlegmon, since treatment by simple incision is so unsatisfactory, many of the patients dying, and some surviving but with loss of sight.

(7) Graves' disease, when the exophthalmos is sufficient to prevent closure of the lids; some of the orbital contents may be removed.

(8) To assist in the performance of posterior sclerotomy, as when cysticercus is present in the immediate neighbourhood of the disc or posterior pole.

(9) In aneurism of the orbit, to enable the whole sac to be removed.

(10) When in any case of choked disc it has been decided in the interests of vision to open the nerve sheath.

(11) For diagnostic purposes in some doubtful cases. In such cases it is highly probable that such an operation will be required at any rate for the treatment of the condition, and by this means the diagnosis is at all events made quite certain. Further, the operation appears to be devoid of danger to life.

The great advantages of Krönlein's operation over the method of obtaining access to the orbit from the front and simply turning aside the eye during manipulations (called by some Knapp's operation)—the method of attacking suitable cases which is at present most usually employed—may thus be expressed: One obtains a clear view and does not work in the dark, he also has space in which to work (in fact he can see what he is doing and he can work at what he sees): the prospect of retaining the eye, provided it is not actually involved in the diseased condition on account of which the operation is performed, is very much better, being 100 per cent. for Krönlein, and 79 per cent. for Knapp, this 79 per cent. including, moreover, a number of cases of phthisis bulbi. Krönlein's method necessitates a skin incision and temporary removal of bone, but the resulting scar is, after all, trifling.

On the whole, even allowing for a little pardonable over-enthusiasm on the part of the writer, the operation is one which ought to receive more than merely casual mention, and will prove of much service in many cases. The only death as yet recorded as following the operation is one in which a tumour was found to be growing intracranially, and its orbital portion (for which the operation was undertaken) was merely an offshoot of a deeply-seated growth which could not be attacked.

The original description by Krönlein of the operation will be found in the *Beiträge zur Klinischen Chirurgie*, 1887.

W. G. S.

J. P. NUEL and F. BENOIT (Liege). Paths of Excretion of the Intraocular Fluids. *Arch. d'Ophtalmologie, April*, 1900.

J. ASAYAMA (Kioto, Japan). Absorption of Aqueous Humour by Anterior Surface of Iris. *v. Graefe's Archiv, li.*, 1, 1900.

The observations upon which the paper by Nuel and Benoit is based were made on man, dogs, cats, rabbits, and chickens, and the conclusions are as follows:—

(1) It is in the anterior chamber that by far the largest part of the aqueous humour is eliminated; in the rabbit alone an appreciable portion escapes along the central

retinal vessels. In man, dogs, cats, and fowl, this posterior current is almost non-existent. A small amount may be taken up by the larger retinal vessels.

(2) In man the elimination takes place at the iridic angle by the canal of Schlemm, the perforating veins, and the veins of the ciliary body. A demonstrable amount escapes through the iris itself, entering the openings on its anterior surface near its root, and also those at the pupillary region.

(3) The human iris is therefore essentially an organ for the absorption of the aqueous, which penetrates interstitially through its whole tissue.

(4) The aqueous finally finds its way into the veins by filtration through the walls of the vessels, not through actual openings in the walls. The canal of Schlemm is a venous sinus.

(5) The canal of Schlemm exists in the dog as in man, but is placed more superficially.

(6) The elimination of the aqueous in the dog takes place as in man.

(7) In the cat the *rôle* of the iris is somewhat less than in the dog, and (8) in the rabbit the iris hardly acts at all in elimination, but to compensate for this there is a considerable current at the posterior pole.

(9) In the fowl the canal of Schlemm and the anterior surface of the iris are the chief paths of elimination.

(10) The rabbit alone possesses an important posterior current of elimination.

(11) In the advanced stage of idiopathic glaucoma all the paths of elimination are more or less obstructed. In certain forms of secondary glaucoma the surface of the iris and even the ciliary body may continue to absorb, but to a very moderate extent, and no elimination takes place by the optic nerve.

The experimental evidence for these conclusions is furnished by injections of Indian ink into the vitreous humour of the living eye close to the posterior pole of the lens, and subsequent microscopical examination after removal. The intraocular pigment was bleached by leaving the sections in chlorine water for two hours.

The paper contains a detailed account of numerous experiments, and is illustrated by several plates of the microscopic appearances found on examination. The observations fully bear out the author's conclusions, and we need only briefly note the experiments upon human eyes in order to indicate what the value of the evidence is.

(1) A child of 5 with an orbital sarcoma. Injection of Indian ink mixture two hours before enucleation. Ink found at posterior pole of lens, vitreous detached in part and drawn forward, no leucocytes, though a small reticulum of fibrine was in the anterior chamber, which was the only sign of inflammatory reaction present. The position of ink granules as seen microscopically was such as to justify the statements in the *résumé* of the author's conclusions.

(2) Injection of ink into the eye of a man aged 55 five hours previous to enucleation. The eye, healthy, with visual acuity of $\frac{3}{4}$, had to be removed in consequence of orbital cancer. Some increase of tension resulted and a certain amount of inflammatory reaction, but the microscopic appearances were essentially the same as those in the first eye.

The experiments recorded in the paper by Nuel and Benoit, as well as those published by Leber and Bentzen, have established the fact that the aqueous humour can and does make its way into the iris through the openings on its anterior surface, but its passage thence into the veins and to the outside of the globe still needs further demonstration. This portion of the subject has been investigated by Asayama in Leber's Laboratory (Heidelberg). Indian ink was injected into the anterior chamber of enucleated eyes, the anterior chamber being first emptied of aqueous, and the colouring matter rapidly found its way into the ciliary vessels, indeed, in six eyes out of twenty-five the injection penetrated into the venæ vorticosæ. These experiments were made on eyes of albino rabbits, and the injections were made under a constant pressure of from 25 to 30 mm. of mercury. Microscopically the pigment granules were found in the blood vessels of the iris only in some of the eyes, but nearly all the episcleral vessels and those of the corneal margin were filled with them. The preparations show also a passage of the pigment from the tissue into the vessels in the ciliary body.

Similar injections in living eyes (of rabbits) demonstrated the passage of the pigment into the iris tissue, but not into the blood vessels, so injection into the vitreous was tried, not as in Nuel's experiments but under a constant pressure. Here, too, pigment was not detected in the interior of the iris vessels, but the iris stroma was deeply infiltrated with it, so that Asayama cannot accept Nuel's statement that the rabbit's iris does not take up the aqueous through its anterior surface. The appearances found in these rabbits' eyes by Asayama exactly correspond with those seen by Nuel in human eyes (*vide supra*). The absence of pigment in the iris vessels in these experiments on living eyes must be explained by the theory that the fluid passes into the vessels by filtration through their walls, as Nuel also holds; this filtration takes place certainly close to the anterior surface of the iris, and perhaps also into the capillaries at the posterior layer. Asayama's observations show no permeability of the posterior surface of the iris.

It will be observed that the only point in which Asayama and Nuel are at variance is with regard to the function of the rabbit's iris, and this is easily accounted for by the different methods of injection employed.

J. B. S.

C. H. MAY (New York). Manual of Diseases of the Eye. *London: Baillière, Tindall and Cox*, 1900.

The number of text-books on diseases of the eye is now so very large that it is wonderful that another author should think it worth while to compete for public favour. It cannot be said in the present instance that the book is written, not with any idea of "success" as ordinarily understood, but to place on record the distinctive views of the author, for he has really confined himself, as he promises in his preface to do, to fundamental facts, and does not attempt to discuss opinions held either by himself or by others. Dr. May says, "The book is not recommended as a substitute for the larger works, but as a means of supplying a foundation to which further knowledge may be added by reference to more extensive and comprehensive text-books." In the limited field which it is thus intended to cover this manual is very serviceable, and quite reliable, and is likely to be widely appreciated.

R. TOUCHE. Cerebral Blindness — Loss of the Sense of Topography. *Annales d'Oculistique, September*, 1900.

The author records at length an interesting case, a brief account of which may prove of value, as the autopsy showed the probable seat of the lesion.

The patient was a man aged 60, who had been in good health up to his 58th year, when (1896) he had an attack of apoplexy, unattended by any loss of consciousness: speech appears to have been affected at the time, but the difficulty gradually passed off. At the date of examination (1898) he was found to have left hemiplegia, with contracture of the left upper extremity and a certain amount of paralysis of the leg; the patellar reflex was not exaggerated; the limb was not altogether incapable of movement. There was also some difficulty in micturition. On October 8, 1899, the patient was struck suddenly with complete blindness; he could not even distinguish light from darkness. When the eyes were examined on the following day there was slight myosis, but absolutely transparent media. There was conjugate deviation of eyes and head to the left: by voluntary effort the eyes could be brought back as far as the middle line, but no farther to the right, and so soon as the voluntary effort ceased they reverted again to the left. Upwards and downwards each eye could be moved quite well, but there was difficulty in lateral excursions, and especially in convergence. From that time onwards, the conditions as regards movement remained the same; the right eye was slightly more mobile than the left.

From the very beginning of the blindness the patient complained of distressing cerebral troubles; he was a prey to extremely annoying nightmare. "I know quite well that these horrible beasts and dreadful precipices have no real existence, yet they terrify me all the more that that is so." On enquiry as to what colours were seen, he described these as being black and rosy white; he saw no intense or bright colours, and never red. Gradually the nightmare became less distressing, and the patient saw only groups of persons, who moved about among one another as in a ballet; pale yellowish and grey were the only colours perceived at that time; he sometimes "saw" birds also. About April, 1900, vision began to return slightly, and at once the nightmares ceased, and the patient distinguished from the first between the objects actually seen and the hallucinations during the nightmare of the blind period. Owing to the extreme deviation of the eyes and to their nystagmic movements, it was impossible to record the field of vision with any approach to exactitude, but it was evident that the patient saw only to his left side, and that the upper part of the field was defective. His colour memory was good; although his employment was not one in which colour played any part, he could describe minutely the colours of horses he had formerly ridden and of objects with which he had been familiar. His recollection of precise outlines (of a face, for example) was very defective: thus, he could not recall the features of Napoleon III., which he must have seen innumerable times on coins. His memory of the relation of one place to another, his topographical memory, was completely gone: thus, though he had lived all his life in Paris, he was unable to recollect the position of the Tuileries or the Hôtel-de-Ville; he remembered that the dome of the Invalides was gilt, but did not know where it stood, and he could not give the simplest directions to any one how to go from one well-known place to another. As time went on, he improved in regard to contour (or face) memory, but his position memory never returned; he gradually got worse and died comatose. At the autopsy, the right hemisphere showed an area of softening in the parietal and temporal lobes: the large extent of the destruction was remarkable, for the second parietal convolution, the supramarginal, the pli courbe, the first temporal (except its anterior extremity) and the posterior part of the island, were all involved. An offshoot of this softening ran between the first and second occipital convolutions, and another along the parieto-occipital fissure; at this part there was some depression of the cortex. Section of this hemisphere showed that the lesions extended as deeply as the lenticular nucleus, and the softening was found also to exist along the deep surface of the calcarine fissure, which explained the depression noticed on its outer aspect. In the left hemisphere, almost the whole of the temporo-occipital lobe was softened, a process which extended also to the cuneus, the lingual and fusiform lobules, the hippocampus, the uncinate gyrus and the second and third temporal convolutions. The corpora quadrigemina were intact, but the central parts of the optic thalamus involving both outer and inner nucleus, the Luysian body and the red nucleus were implicated more or less. There was yet another area of softening on the upper aspect of the left lobe of the cerebellum. The conclusion which the author draws is that the topographical sense is situated in the left fusiform lobule, but when the lesion is so widespread any conclusions must be received with caution. It is interesting to notice that colour-memory was preserved so well, in spite of so complete a destruction of the inferior aspect of the temporo-occipital lobe.

W G. S.

TERSON (Toulouse). Removal of a Portion of the Anterior Capsule in Extraction of Cataract. *Annales d'Oculistique, Oct.*, 1900.

The removal of a portion of the anterior capsule is not a new procedure, but neither is it one which is looked upon with very much favour by the majority of surgeons, both because it is regarded as unnecessary in fact, and as open to serious dangers as well. Daviel advised that in cases in which the capsule itself was opaque a portion should be removed with forceps, but only in such cases. The author traces the first suggestion of the routine use of the forceps for such purpose to Poutier, who wrote in 1804. It cannot in those days have been easy to carry out this manœuvre, since fixation of the globe was very imperfect, and anæsthesia, either local or general, as yet undreamed of.

Very frequently, Terson asserts, the capsule retracts beyond the iris at the very first touch of the cystotome, and the operator is apt then needlessly to scratch the actual substance of the lens. Others since the days of Poutier have attempted procedure somewhat similar to his, notably Meyer with his double cystotome, Perrin, Vacher, and others besides. But if the manœuvre is to be carried out at all, it must be by means of extremely fine forceps specially adapted for the purpose. Both Förster and de Wecker have devised forceps intended for the removal of capsule which have been modified with greater or less success by various operators—a fact which indicates both that there is a feeling in favour of having some means of attaining this end, and the difficulty of obtaining an instrument which is in all respects satisfactory. Terson, by the way, entertains no doubt that it is to the anterior capsule that subsequent interference with clear vision after cataract extraction is due, so that the wisdom of making such attempts requires no discussion, and the only question is, can it safely be done? If an iridectomy has been performed in the course of the extraction, removal of part of the lens capsule is fairly easy, and even in certain cases in which the "simple" operation has been performed it can be managed without any great difficulty, though certainly less easily and less constantly. So decided is the difference between the two methods of operating in this respect that Terson says that he now finds it better in a large number of cases to resort to iridectomy rather than continue his former method of extraction, for he considers the attainment of a pupil, clear from capsule and which will not require further interference, with the risks thereby involved, to be a greater gain than even "the charm of a round pupil." It is true, he makes his iridectomy very narrow, but there is no need from any point of view ever to make the iridectomy anything other than narrow. Terson admits, further, that so far as subsequent vision is concerned his experience shows that there is no superiority of one method of extraction (*i.e.*, with or without iridectomy) over the other. Naturally in the cases in which the sclerosing process attacks the capsule as well as the lens itself, removal of a portion is more easy, but Terson finds that the more constantly he has adopted the manœuvre the less difficulty he has experienced in its performance in all varieties of cases, so that now he removes some of the capsule without hesitation, not only in hypermature cataract, but in immature, and even when extracting the clear lens for the relief of myopia.

Once the operator has succeeded in seizing the capsule it is probable that he will remove a morsel of considerable size, for the structure becomes thinner and less resistant as the periphery is approached, and will therefore be likely to give way even a little more peripherally than the point of seizure, but this in reality is of but little moment, since a very small aperture is all that as a matter of fact is required to enable the patient to see, and the chief value of the removal is that it prevents the complete apposition of the two layers of capsule, anterior and posterior. The chief danger, of course, is that of dislocation of the lens, but Terson's experience goes to show that there is not much need to fear, especially if the following precaution is attended to. Before proceeding to operate at all he dilates the pupil, and carefully, by means of oblique illumination, examines the surface of the capsule; if this is smooth, uniform, and shows no markings, he is satisfied, and may employ no instrument other than the fine forceps, under the teeth of which it will give way without any danger of the smallest displacement of the lens. But if it shows various markings and alterations of shading, particularly in the pupillary area, it is better at the operation to take a cystotome, and with it make a small scratch at the lower margin of the pupil; the forceps will then be able to remove without any risk a suitable portion of capsule. When using the forceps it is essential that no tugging or other rough dealing should occur, as dislocation might thus be easily brought about. If the manœuvre be attempted without iridectomy there is also a little risk of catching the margin of the iris with the heel of the forceps; but besides employing iridectomy, as indicated above, he has his forceps, as an additional precaution, so made that at the heel (the part at which the bend occurs) the limbs do not meet closely, but are separated by a slight interval; this obviates all risk of pinching up the iris. To the lower end of the forceps is imparted a backward curve in order to adapt it more suitably to the posterior surface of the cornea, and so avoid lifting up the corneal flap unnecessarily. Terson's custom—and this seems to the reviewer to be distinctly a weak point and quite needless if the previous contentions are correct—is to use at one and the same moment both forceps and cystotome! He then follows one of two alternative procedures:—(*a*) He scratches with the cystotome and immediately grasps with the forceps and removes a piece; this enables him to avoid removing too small a fragment; at the same time he is careful not to mark off a portion completely with the cystotome, lest it might not all come away in the forceps, but be left behind and cause trouble. (*b*) In other cases he reverses the order, and uses the forceps first, subsequently incising the capsule a little more extensively if he is not satisfied with the amount of it which has come away.

A further advantage which he claims to secure by this operation, in addition to the avoidance of subsequent needling, is that by allowing the aqueous humour free entrance into the sac he greatly diminishes the risk of septic infection, since this fluid constantly washes out any deleterious substances which might otherwise collect within the capsule.

W. G. S.

PERLIA (Crefeld). Stereoscopic Pictures in the Treatment of Strabismus.

To those whose experience has encouraged them to employ the stereoscope in the treatment of strabismus, the series of pictures issued by Perlia (Crefeld) and published by Voss (Hamburg) will probably prove very useful. They consist principally of coloured illustrations likely to prove interesting to children, each of the two which form, when combined, a composite picture, containing some object not to be found in its fellow, and thus it is only when the two eyes are in use that the whole scene is perceived. We ourselves have never been convinced that such methods are of much value in treatment, but some of our colleagues have had different experience and employ those means with a measure of success not to be attained, as they believe, by other means.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, DECEMBER 13, 1900.

G. ANDERSON CRITCHETT, F.R.C.S.Edin., President, in the Chair.

CLINICAL EVENING.

A Case of Congenitally Imperfect Separation of Iris from Back of Cornea.—Mr. J. Herbert Fisher. The case was that of a Jewess, aged 27. Around the whole outer margin of the cornea there was a narrow crescent of pigmented iris tissue adherent to the back of the periphery of the cornea ; delicate strands of iris tissue passed from the anterior surface of the iris on to this detached slip, the latter being obviously split off from the former. On the inner side was a similar but narrower slip of detached iris tissue adherent to the back of the cornea. Three instillations of homatropine and cocaine drops in this eye, used for purposes of refraction, were followed by a rise of tension to + 1, and a dilatation of the pupil which persisted three days later, when both the high tension and the dilatation yielded to eserine. There was astigmatism in this eye, which Mr. Fisher suggested was perhaps indicative of faulty development of the cornea. He considered that the case was of great interest as bearing on the original of congenital glaucoma or buphthalmus.

Large Dermoid Growth of Cornea in an Ox's Eye.—Mr. W. T. Lister. The specimen exhibited showed a large fleshy mass at the side of and also extending over about a quarter of the corneal surface, and bearing a thick tuft of brown hair. It bore considerable resemblance to a picture published by Mr. Bland Sutton.

A Rare Example of Persistent Pupillary Membrane.—Mr. G. Brooksbank James. At first sight this case presented the appearance of a pupil occluded by iritis; but on closer examination the iris was seen to be bound to a whitish central opacity by several distinct strands of tissue, leaving some half dozen distinct pupillary openings, each of which re-acted normally to light and to atropine. In the fellow eye there was an ordinary strand of pupillary membrane.

Superficial Choroidal Atrophy without Subjective Symptoms, in a Member of a Family subject to Night-blindness.—Dr. A. Hugh Thompson. In this case each fundus showed an area of superficial choroidal atrophy with well-defined margin round each disc, with disturbance of pigment beyond, the changes being symmetrical in the two eyes, the vision good, and the refraction nearly emmetropic, without any notable defect in the fields or any complaint of night-blindness. There was a definite history of night-blindness, however, in the patient's father, who had died thirty years ago, and also in three nephews, brothers to each other and grandsons of the patient's father. One of these had lately been seen at Moorfields and was found to have symmetrical changes in the two eyes, namely atrophy of the chorio-capillaris with pigmentary changes except in a well-defined area round each macula, but with pigment changes at the macula itself; good central vision, but a ring-scotoma in each eye and complaint of night-blindness. There was no history of consanguinity in the family.

Dr. Edridge-Green said it would be interesting to know whether the patient saw as quickly with the yellow spot as normal-sighted people. Normally, on waking up in the morning and looking at a dimly-lighted surface, a black patch appeared in the centre and gradually light seemed to invade it from without inwards. This he attributed to the time occupied by the diffusion of the visual purple.

The President remarked on the great benefit to be derived from the wearing of golden-yellow glasses in cases of night-blindness.

Dr. Tempest Anderson enquired what the explanation of this was, and referred to the use of a yellow screen in photography as being useful in certain landscapes, especially when there was a blue haze.

Mr. Nettleship said that in spite of the widely-spread pigment changes in the patient's eyes the retinal vessels appeared to be of normal size, and enquired whether that was also the case with the nephews. Did the father go blind, and was the sight of the nephews getting worse?

Dr. Thompson replied that the father did not go blind, and that the nephews were getting worse. As to the retinal vessels in the one nephew, whom he had seen, he thought they were of fairly good size.

An Unusual Case of Choroiditis.—Dr. Charles Blair. The patient was a married woman of 42. In the lower part of one fundus were numerous closely-packed cheesy-looking yellow-white patches, some discrete but mostly confluent, apparently not raised, with sharply defined more or less irregular edges. The retinal vessels passed over the patches uninterruptedly, and there were no choroidal vessels visible. There was an absence of pigmentation and the condition was entirely confined to the lower segment of the fundus. There was a corresponding defect in the field of vision, and central vision was reduced to $\frac{4}{60}$. There was a little cloudiness of the vitreous. The defective sight had only come on about two months ago.

Dr. Batten referred to a case that he had shown two years ago, in which the ophthalmoscopic changes were very similar but far more diffused, and in which the vision was not affected. The condition was probably congenital.

Dr. C. O. Hawthorne said he had lately seen a patient in whom the appearances were practically identical with Dr. Blair's case. The condition had come on recently, and there was a similar defect in the field.

Nævus of Orbit.—Mr. T. Holmes Spicer. The patient, a young woman of 23, had first come to Moorfields two and a half years ago with prominence of the left eye, which had been noticed since her marriage, and which increased with each pregnancy. There was some proptosis, and on deep pressure the sensation to the touch was that of a collection of worms. There was no hard mass to be felt and no pulsation in the orbit. Vision was $\frac{6}{24}$ ($\frac{6}{6}$ in the other eye). Fundus normal. Movements not appreciably impaired. Electrolysis had been performed on two occasions, but apparently without much effect. In the spring of this year the proptosis had increased very much, and the lower part of the cornea was exposed. The movements of the eye were limited, and above and below the globe two masses could be felt with the characters of solid tumours. The portion of the swelling which was still fluid could be emptied by pressure but filled immediately. The hard masses were considered to be the result of electrolysis, and a further electrolysis was proposed but not performed on account of the probability of a free communication with the cavernous sinus existing at the apex of the orbit, as evidenced by the rapidity with which the tumour refilled after being emptied by pressure. Shortly afterwards the cornea became ulcerated from exposure, and to relieve pain the eye was excised. Since then the condition of the tumour had not altered. The case was brought up to ask the opinion of members as to the advisability of further interference, such as evacuation of the whole orbit.

The President and some other members expressed the opinion that this would be a somewhat risky procedure.

The following specimens were also shown :—

Growth in Cornea, with microscopical sections prepared by Mr. Lister.—Mr. A. S. Morton.

Conjunctival Growth (? *Pinguecula*).—Dr. W. C. Rockliffe.

Tubercle beneath Ocular Conjunctiva.—Mr. R. Marcus Gunn.

? *Epibulbar Sarcoma.*—Mr. J. H. Fisher.

Diagram of a large Pigmented Area below the Disc, probably of the nature of a Coloboma.—Mr. G. Brooksbank James.

Erratum.—In the report of the November meeting in the last number (p. 359), Mr. Griffith is reported to have said that lamellar cataract was due to a defect in the enamel cells laid down early in fœtal life. What he really said was that the defective teeth associated with lamellar cataract were so caused.

CLINICAL NOTES.

Validol.—In certain cases of scintillating scotoma, Neustätter (Munich) has found twenty-minim doses of this substance, which is the valerianate of menthol, highly beneficial, relieving both the headache and the troublesome visual complications. The first dose should be taken as soon as symptoms begin to manifest themselves.—*Die Ophthalmologische Klinik*, June 20, 1900.

Spontaneous Rupture of the Globe from Hæmorrhage.—Spontaneous hæmorrhage into the globe, even a very large escape of blood, is not so very uncommon, but the peculiar feature of the case recorded by Hauenschild (Würzburg) is that, in an apparently healthy eye, the hæmorrhage was so excessive as actually to rupture the globe. The patient was a healthy young woman of 28, who up to her 17th year had been liable to sudden and violent epistaxis; she apparently had also had hæmorrhage into both orbits on a former occasion. On the day on which the intra-ocular hæmorrhage occurred she had been complaining of not feeling well, when quite suddenly a very severe attack of pain in the right eye came on, and almost immediately blood escaped from between the lids. Next morning the lids and conjunctiva were suffused with blood, the whole anterior chamber was filled with it, there was slight proptosis, and the eye was entirely blind. A blackish line, similar to what one generally sees in cases of rupture of the globe, was observed running concentrically with the upper margin of the cornea. As the blood became absorbed again, it became manifest that a rupture really did exist, running for a distance of 6 mm. along and about 1 mm. behind the upper margin of the cornea, and then at one extremity turning backwards in a meridional direction almost at right angles to its former course for a distance of 4 mm.; over an area corresponding to the ciliary rupture the iris had completely disappeared. Gradually complete absorption of the blood proceeded, and the fundus, which could be clearly seen, showed no evidence of any ruptured vessel from which the hæmorrhage could have come; vision on correction reached $\frac{1}{2}$, and the field was not restricted. Examination of the urine and of the blood itself showed no pathological condition, and the only fault that could be found with the general state of the patient was that she had probably been rickety. This hæmorrhage took place three days before the menses were due, and she stated that on some previous occasions epistaxis had occurred at a corresponding date. The only case which the author has been able to discover at all analogous to this was recorded by Millikin at a meeting of the American Ophthalmological Society (1899).—*Münchener Medicinische Wochenschrift*, 31, 1900.

HEMIANOPSIA IN ONE EYE PRODUCED BY CEREBRAL TUMOUR.—A case has been recently described by Linde, which is stated to be the first published in which a cerebral tumour has produced hemianopsia in one eye, and the diagnosis has been verified at the *post-mortem* examination. The case was that of a man who suffered from loss of smell and partial paralysis of the left external rectus muscle; there was also some failure of memory. The affected eye was hemiopic, the macula being preserved, and Wernicke's pupil symptom was present. There was double optic neuritis; the tongue deviated to the right side. The necropsy revealed a tumour in the region of the hippocampal and uncinate gyri on the right side, which was pressing somewhat upon the right sixth nerve.—*Lancet*, September 22, 1900, quoting from *Monatsschrift für Psychiatrie.*

THE EFFECT OF STRABISMUS OPERATIONS UPON THE CURVATURE OF THE CORNEA.—As the result of a somewhat prolonged series of investigation into this matter, Melloni comes to the following conclusions: Of all squint operations, it is well to recollect that that one which most affects the corneal curvature is tenotomy with capsular advancement of the opponent. Simple tenotomy of the internal rectus can hardly be said to affect the curvature of the cornea at all, but when any change does occur, it is in the direction of an increase in the curvature of the vertical meridian; with this a decrease in the acuteness of curvature in the horizontal meridian may be associated. An alteration in the principal axes of curvature may be brought about by the influence of an operation on the muscles. The increase or decrease in curvature arising from such operation is usually permanent.—*Annali di Ottalmologia*, *Pavia*, xxix., 4, 1900.

Simple and "Combined" Extraction.—The controversy still goes on as to whether it is better to perform an iridectomy or not in the course of the operation for cataract, and probably the statistics for various operators will vary much according to methods and to the personal co-efficient, so that too much stress must not be laid on the records of the experience of an individual. Silfrast has examined with care records of 285 cases under his charge, divided nearly equally between the two methods, and his results are very decidedly in favour of the performance of iridectomy. Dividing the results into three classes, good, medium, and bad, 80·8 per cent. of the cases with iridectomy fell to be placed in the first class, but only 69·9 per cent. of those without iridectomy could be put beside them; 17·5 per cent. by the former method, and 18·5 per cent. by the latter went into the second class; and 1·7 per cent. of these with iridectomy, as against 11·5 per cent. of those without were found in the third class. Twelve per cent. of those without iridectomy had prolapse of the iris.—*Finska Läkaresällskapets Handlingar* April, 1900.

In common with all Her Subjects, we deeply
mourn the Death of
Her Most Gracious Majesty
VICTORIA,
The Great and Good.

GOD SAVE THE KING!

A CASE OF ACUTE GLAUCOMA INDUCED BY COCAINE.

By Simeon Snell, F.R.C.S.Ed.
Ophthalmic Surgeon to the Royal Infirmary, Sheffield.

In the number of the Ophthalmic Review for November, 1900, Dr. Hinshelwood recorded a case of acute glaucoma after the use of cocaine. Ever since its first introduction cocaine has been in very frequent daily use in my practice, and must, therefore, have been instilled into several thousands of eyes. Its use has been absolutely unattended with untoward circumstances as far as the eyes were concerned. In glaucoma it has only been employed as an anæsthetic at the time of operation. Curiously enough, however, the day after reading the record of the case to which reference has been made a very similar instance came under my notice. From the notes of the case it will be seen that there were indefinite premonitory symptoms of glaucoma, and that the cocaine precipitated an acute outbreak. The weakness of the solution of the cocaine should be noted.

On November 19, 1900, a medical friend called on me to request that I would see a patient of his with him. His description of the case led at once to the assumption that it was one of acute glaucoma which he feared had been induced by the use of cocaine. The following is the history of the case.

At my medical friend's desire the lady had consulted me two years ago. I then found vision in each eye good, and it was merely a question of ordering proper glasses for her presbyopia. After this there was no further trouble with her eyes, but it was ascertained subsequently that occasionally for some little time before the period of which we have more particularly to speak she had noticed, at times, obscuration of vision in the right eye, not sufficient, however, to make any lasting impression upon her. When my friend visited her on November 15 she complained of discomfort in the right eye, for which he prescribed cocaine drops (1 per cent. solution). These were instilled three times that day, and once on the 17th. At his visit on the 18th he found the tension of the globe increased and sight considerably obscured, and the use of cocaine was discontinued. On the 19th he requested me to see her. I then found the condition as follows :—

Right eye : + T 2, pupil dilated, cornea steamy looking; vision = fingers very indistinctly, and pain considerable.

Left eye : Tension was somewhat increased, but sight but little affected.

Having suspected the nature of the case, we had taken a supply of eserine with us, and this was accordingly dropped into each eye and ordered to be repeated three times more before we again visited the patient at night. At 9.30 the same evening the right eye was practically in the same condition and the pain continued, but in the left tension was normal. Iridectomy was thereupon advised for the right eye and consented to, the operation being performed the next morning under ether. Satisfactory recovery of vision has resulted.

REVIEWS.

Uhthoff (Breslau). Toxic Optic Neuritis. *Klinische Monatsblätter für Augenheilkunde, August and September*, 1900.

We are warranted now, thinks Uhthoff, in classifying the various forms of toxic optic neuritis on clinical and anatomical grounds. There is no possibility of doubt that, for example, tobacco amblyopia is totally different in its nature from that due to quinine, and starting from these two types, he arranges toxic amblyopia of various origins into two groups. The First Group contains those forms whose primary features are *retrobulbar neuritis, a central scotoma, and a normal periphery of the field*. In this class the prognosis is good, the process is, and remains, partial, attacking the papillo-macular bundle of fibres only and not the whole substance of the nerve. The appearances on the disc of inflammation are therefore comparatively slight as a rule, and the subsequent atrophic decolouration is limited to the outer half in the great majority of cases, while alterations in the retinal vessels and in the periphery of the nerve are either late or absent altogether. To this group belong especially ALCOHOL and TOBACCO, but also bisulphide of carbon, stramonium, arsenic, iodoform, and cannabis indica. Of course anatomical examination of the tissues has not been possible in the case of all these, but judging by analogy he thinks this a fair deduction in the case of each of them. Auto-intoxication can and does sometimes produce similar results and lesions, notably in the case of diabetes; but also, though much more rarely, in gout, cancer, pregnancy, lactation and in the puerperium. It may be remarked here that these are precisely the conditions under which peripheral neuritis of other nerves than that of sight arises; to this point he reverts later.

To the Second Group belong several substances, of which the chief is QUININE, and others are salicylic acid, male fern, and pomegranate. The cardinal symptoms of this second group are *marked pallor of the whole disc, diminution of the calibre of the vessels, peripheral restriction of the field of vision, and the absence of a (specially) central scotoma.* In this class the changes primarily affect the vascular system of the fundus; and besides the direct toxic action of the substance upon the nerve elements there is also to be considered as an important element the contraction of the vessels with changes in their walls, the consequent insufficient blood supply and the ischæmic necrosis which may occur. In regard alike to ophthalmoscopic appearances, visual symptoms, and condition of the field of vision (contracted from the periphery inwards), the second group forms a marked contrast to the first, and in it peripheral multiple neuritis does not seem to occur. Uhthoff emphasises the fact that the ophthalmoscopic changes, manifest though they are, are not sufficient of themselves to account for the degree of amblyopia, and one is obliged therefore to suppose that there is superadded some direct deteriorating action upon the vessels and the nerve tissue. In this respect it is specially to be noted that there is no record of any case of amblyopia due to ergotin, notwithstanding its powerful action upon the vascular tissue, which is probably due to the fact that it has no actual toxic power at all.

To Lead Uhthoff assigns a place midway between the two groups, for while there exist on the one hand cases of optic neuritis, the vascular system also suffers severely on the other. Visual lesions also occur in poisoning with nitrobenzol and anilin, in snake-bite and pellagra, but these are as yet ill defined and have not been sufficiently investigated to permit of their classification. On the whole the more typical class of poisonings as regards visual matters by far is the ectogenous, in it we see much more regular sequence, while in the auto-intoxications we see more uncertainty and waywardness, sometimes for example, obvious ophthalmoscopic changes with little in the way of symptoms. It is interesting, too, to note how many of the conditions of auto-intoxication seem to have no direct action on the optic nerve, for example, Addison's disease, jaundice and myxœdema.

It is of interest also to inquire how far either an ectogenous or an auto-intoxication has the power of producing a simple complete atrophy of the optic nerve, such as we see in tabes, for example; it has been observed in pellagra alone, if in that. Of course atrophy follows readily enough on various other changes, such as inflammation affecting the nerve itself, the vessels and the sheath, but it is of the strictly simple atrophy that Uhthoff is here speaking. He very properly refuses to accept the statement sometimes made that a true tabetic atrophy is preceded by some inflammation, and he adds, though this is perhaps a little more open to doubt, that a central amblyopia with a good periphery such as one sees in retrobulbar neuritis, is practically never to be seen in simple tabetic atrophy; in sections of such nerves he has always found evidence of interstitial neuritis. The amblyopia of tobacco and alcohol abuse is not an affection of the ganglion cells of the retina as has been suggested, with consecutive ascending atrophy, for the microscopic appearances negative such an idea, and changes in the retina when they exist are really secondary, and of the nature of a descending degeneration.

A further interesting point is that of the relation of the peripheral neuritis which occurs here and there in the body to that indicated by the amblyopia, and it is certainly very striking that it is just those toxins which produce the one which are capable of producing the other, alcohol, arsenic, carbon bisulphide, lead, diabetes and cancer, with the very notable exception of tobacco; while on the other hand, there are certain poisons which, though capable of producing peripheral neuritis, have not yet been shown to bring on the same affection of the optic nerve, such as carbonic acid, copper, mercury, silver and tuberculosis. The bodies belonging to the second group, that containing those whose chief action is shown ophthalmoscopically by great reduction in the vessels, seem to have no power of producing peripheral neuritis. Uhthoff thinks that we should to some extent regard what is visible in the optic nerve as a clear indication of the processes which peripheral nerves are undergoing, and we have the enormous advantage in ophthalmoscopy of being able to examine under considerable magnification a portion of an affected nerve, its area of distribution, and the vascular condition of that area. And further in the case of no other nerve, can one more precisely examine into its functions than we can in the case of the optic. We are in a position, he considers, to observe with much success the primary degeneration of nerve fibres set up by the primary interstitial processes, with the secondary atrophy of the nerve elements, at least in certain stages of the development. It is true that in the later stages of simple primary atrophy such as occurs in tabes, certain secondary changes take place in the interstitial tissue, but these are of a totally different character from the primary changes just spoken of.

In retrobulbar neuritis Uhthoff is convinced the process is not that of a primary affection of the visual fibres, with secondary interstitial changes, for the clinical and anatomical facts go to show the contrary; on this point he has no hesitation in differing from certain other authors who hold that all such nerve degenerations are primary.

Uhthoff has collected out of the literature of the subject a number of cases in which isolated "infective" optic neuritis has followed one or another of the contagious diseases (using that word in its widest signification), and remarks upon the striking rarity with which such complication does occur; for example, there is so far as he can find, no case of optic neuritis following cholera. Among the cases thus collected that type of retrobulbar optic neuritis in which the ophthalmoscopic changes are slight or altogether absent was decidedly rare, and when present was almost always unilateral; very much more common was there obvious inflammation of the nerve head, choked disc, or neuro-retinitis, followed by optic atrophy—and this almost always bilaterally.

The whole subject is one which, as he says, opens up great and interesting questions upon the pathology of various nervous diseases, the influence of toxins, &c.

The paper was read at the International Congress in Paris. W. G. S.

A. BIRCH-HIRSCHFELD (Leipzig), & **W. HAUSMANN** (Dresden). **Three Cases of Conjunctival Tuberculosis.** *Klinische Monatsblätter für Augenheilkunde, October and November*, 1900.

The first case observed by the authors was in a healthy young man, aged 26, with a good family history, in whom a possible source of infection was found in the fact that some months previously the patient in the course of his employment had been in the habit of milking a tuberculous cow.

The appearances resembled acute trachoma, there being a large number of semi-transparent nodules in the conjunctiva and fornix of the upper lid. The preauricular gland was distinctly swollen. Under the microscope typical tubercular nodules with caseation and giant-cell formation were found, but no bacilli could be demonstrated in the sections. Inoculation into the anterior chamber of the rabbit, however, was followed by the development of typical tuberculosis. The case was eventually cured after removal of the greater part of the upper lid, the defect being partly made good by a plastic operation.

The second patient was a girl, aged 2, whose mother had died of phthisis shortly before the child came under observation. In the left eye the inner surfaces of both upper and lower lids were covered with numerous small or confluent ulcers, between which were many small grey sub-conjunctival nodules. The cornea and deeper parts of the eye were normal. The preauricular gland was swollen and tender, and there were some enlarged glands with a discharging sinus under the jaw. A diffuse bronchitis of doubtful origin was present. Microscopical preparations of the ulcerated conjunctiva showed tubercular tissue in which bacilli were present in considerable numbers, and in the conjunctival secretion a few tubercle bacilli were demonstrated. To remove the disease the whole of the tarsal surface of the lower lid was dissected off after splitting the lid, and the inner surface of the upper lid treated freely and repeatedly with the thermo-cautery.

The tuberculous process was brought to a standstill, though of course in the treatment adopted the formation of complete symblepharon was unavoidable. While this eye was still undergoing treatment a phlyctenular conjunctivitis of moderate intensity developed in the other, but it yielded readily to ordinary applications. In this case the authors conclude that a tubercular infection from the mother was made possible by the occurrence of lymphatic conjunctivitis producing small epithelial defects, thus allowing the bacilli to find entrance into the tissues.

The third case cited was one of lupus of the conjunctiva in a delicate girl, aged 17, with a strongly tubercular taint in her family. In addition to the conjunctival affection there was lupus on the face, in the nasal passages and on the epiglottis, but which of these was the primary seat of the disease it was impossible to decide. The changes in the conjunctiva resembled very closely the cicatricial changes in old-standing trachoma, only a few lupus nodules being present. The cicatrix was here in part the result of former operative treatment. The authors are of opinion that there is a risk that cases really of tubercular nature may be mistaken for trachoma. Diagnosis is made certain by a demonstration of the bacillus, or by successful inoculation from diseased tissue; as treatment, free use of the knife and thermo-cautery is recommended. Treatment by tuberculin has proved futile in the hands of most observers.

J. V. PATERSON.

VIEUSSE (Toulouse). Empyema of the Frontal Sinus. *Recueil d'Ophtalmologie, August and September,* 1900.

The author, who discusses the subject of inflammation of the frontal sinus in considerable detail, asserts that many cases occur which escape notice.

After dwelling rather minutely on the anatomical features and relations of the double cavity, he draws attention to a peculiarity of its growth. Appearing at the second year after birth, it only begins to assume any appreciable size at the seventh year. It continues to increase gradually until the twenty-fifth year is attained, when there is a cessation of growth. At the age of 40 years it once more begins to enlarge by a process of osteoporosis. The rarity of inflammation occurring here in the young subject is thus accounted for, unless it is of a specific nature and arises in the bone. The fact of inflammation occurring more frequently in males than in females is ascribed to the relatively smaller size of the cavity in the latter. Another coincidence noticed, but which remains unexplained, is that the inflammation supervenes much more frequently in the left half of the cavity. An anatomical peculiarity recounted is the extremely rare presence of two fronto-nasal canals, though a lacuna is not invariably present in the septum which divides the two portions of the cavity from one another.

Inflammation of the sinus may, of course, be of a mild type, and it is then generally associated with rhinitis and yields to local remedies; but it is the graver form of empyema to which the author attracts attention at present, a condition which has to be carefully distinguished from the appearances presented by orbital abscess *per se*, syphilitic gumma, tubercular osteitis of the upper wall of the orbit, and by tenonitis. It is primarily due to closure of the naso-frontal canal and infection of a microbic character, and is sometimes observed as a sequela of one of the exanthemata.

The symptoms are usually chronic in character, and their degree of severity greatly depends on the dimensions of the sinus. Pain is the predominant early feature and may continue for years, and be very severe but intermittent, and during its times of quiescence it may readily be excited by means of percussion over the affected area. In one instance cited by the author the pain was connected with the menstrual period, and was accompanied in the eyes by a transitory paresis of the power of accommodation. This has repeatedly been observed by others also. Swelling is only seen in the later stages, when it is often also possible to elicit crepitation over the bulging and attenuated osseous wall. A lacuna may at other times be felt in the same structure, having been caused by absorption. The lower floor of the sinus, constituting the roof of the orbit, presents several small openings of vascular foramina which allow the pus readily to percolate through; it may thus invade the orbital tissues, giving rise to further serious complications.

When pressure on the floor of the frontal sinus causes the orbital roof to bulge downwards, it gives rise to hyperæmia of the conjunctiva, lachrymation, and eventually to diplopia by displacement of the globe; inflammation, and even atrophy of the optic nerve due to stretching, may subsequently occur. After a long time a fistula may become established, usually in the upper oculo-palpebral fold, from which the pus may escape with a pulsatile motion synchronous with that of the arterial system: this, however, has not yet received any satisfactory explanation. Unless the empyema is spontaneously relieved, the best object at which to aim in treatment is the restoration of the communication which naturally exists between the frontal sinus and the cavity of the nose, but this is far from easy, and not always satisfactory. The more usual method of procuring relief is to trephine the anterior wall of the sinus above the root of the nose. A short vertical incision is made, about 4 cm. long, slightly to one side of the mesial line, and another one of similar length, joining its lower end, is made outwards, parallel to the line of the eyebrow. The triangular flap of skin thus defined, and with the periosteum included in it, is dissected back to allow of a suitable opening being formed in the bone either by the trephine or with a mallet and chisel. The cavity having been opened and properly cleansed, a drainage tube is temporarily placed in the naso-frontal canal, and is retained in position by means of a suture, which being attached to its lower end, emerges through the nostril and enters the wound on the forehead, where it is again secured to the tube at its upper end. When both sinuses are affected, the second one may be reached by an opening made in the dividing septum, unless an aperture which is sufficiently large already exists there. Owing to the rigidity of the osseous walls, the conditions are not favourable for rapid healing, and the process is often a prolonged one, the result not unfrequently being an imperfect cure, with the persistence of a small external fistula.

The author includes one case of his own in illustration of his subject, and quotes *in extenso* two cases, taken from published records elsewhere.

KENNETH SCOTT.

OSSWALD (Winterthur). Erythropsia after Operation for Myopia. *Beiträge zur Augenheilkunde*, 45, 1900.

In the normal condition erythropsia, which appears to be certainly due to the action of the light waves of short wave-length, is very much more frequent at high altitudes, where the sun's beams, reflected off the snow, are very rich in violet and ultra-violet rays, than is the case in lower lands. What gives further support to the opinion that erythropsia is due chiefly to the highly refracted rays is the fact of its greater frequency in eyes from which the lens has been removed, whether with or without iridectomy. It is further interesting to note a certain close relation between night-blindness and erythropsia. Krienes, for example, reported a case in which a patient with high myopia had red vision in the dusk for objects situated laterally, he having at the same time almost complete central loss of vision. Förster also has related cases in which acute night-blindness was present along with a complaint of erythropsia, and others have observed a similar relation. Some have described their patients as suffering at first from green vision, but in the four cases observed by Osswald, this symptom was never present at any time, nor did he experience it himself. The author is himself myopic, it should be mentioned, and underwent extraction of the lens of the right eye with success at the hands of Haab of Zürich, and the occurrence of erythropsia in his own person helped to direct his thoughts to the study of the conditions under which it arises generally.

In different patients there are great personal differences in the duration of red vision and in the conditions under which erythropsia arises, and of two patients under precisely the same conditions one will develop the symptom while the other keeps entirely free of it; in some persons it arises with great ease, possibly enough the general state of health may be of considerable importance in this relation. In his own person Osswald noted that the slightest degree of red vision appeared now and then in the evening following a bright day, when any bright object appeared to have a yellowish tinge. It is usual for sufferers from erythropsia to feel it chiefly, and perhaps only, on rapid diminution of the light, and Osswald was able to note the early and slighter conditions because it was solely and only in his operated eye that the symptom ever appeared. He never had true fully developed erythropsia, except after mountain excursions among snow in bright weather; if the sky continued to be clouded he had no uneasiness of that sort whatever. Even the wearing of dark glasses did not prevent the onset of erythropsia in the high mountain excursions; it came on first in the evenings about dusk, and appeared to occupy the whole field, when all bright objects seemed to acquire a reddish colouring. The first time he noticed the symptom at all was when, about two months after the last discission, he travelled in a train after a long day on the snow. The ordinary white lights of the station as the train ran into it in the evening seemed to him all so red that he was at a loss to know what all the signals could indicate, but on closing first one eye and then the other, he discovered that he was deceived by the sudden onset of erythropsia in the operated eye. From this fact he draws the curious deduction that persons predisposed to erythropsia [Who are these?—Ed.] are not suitable railway servants. Next morning the red vision was almost completely gone, but its occurrence suggested to him to try to bring it on again voluntarily for the purposes of study. With this object in view he used to go about in the snow for an hour or two, when if the sun was shining brightly he had no difficulty in observing the symptom, but if the sky was dull he had no success, even when he had artificially dilated the pupil. When he tested himself with the perimeter he found that the intensity of colouring became less as the periphery was approached, and was very much more intense at and near the centre than anywhere else ; a further interesting point was that the colour was more brilliant to the inner than to the outer side of the fixation point, thus a lamp, fixed by the right (aphakic) eye directly appeared red, and similarly if allowed to shed its light upon the eye from the left side, but the red became very feeble, though quite recognisable, when the lamp was placed to his right. He did not find that during the existence of the erythropsia the field of vision was restricted to any degree greater than could perfectly be accounted for by the diminution of light ; within the area of most intense erythropsia all the colours were considerably altered, white appearing as vivid red, blue as violet, red as a dark brownish-red, green as olive-brown, and yellow as orange-red ; in other parts of the field the change was less manifest.

There are numerous theories in regard to the origin of erythropsia, none of which is in every respect satisfactory. That of Snellen deserves special attention : he regards the red vision as due to successive contrast to previous green vision ; when out of doors under suitable conditions, the periphery of the retina receives a copious influx of bright light, which passes to it through the lids, which are themselves often swollen and filled with blood from sun burning, while the patient keeps them half closed and peers between them ; thus the rays received by the eye are poor in non-red rays. As a simultaneous contrast green vision is thus produced, and when the exposure ends red vision, the after-contrast, is brought about. Koster suggests that the *rôle* of the reddened and hyperæmic lids may be played also by the ciliary processes and contracted iris. Birkhoff has carefully investigated these two combined theories by experimenting thus upon himself ; he applied homatropin, and then covered over the eyelids and lid margins with black paper and soot, so that on going out into bright sunshine with closed eyes he could perceive no light whatever; he then having treated one eye in this manner exposed both, open, to very bright illumination for a time. On retiring from the sunshine into a half dark chamber for a time, he experienced erythropsia only in the treated eye, which makes Snellen's theory untenable. With the idea of putting Koster's theory to the test also, he had a small tube made with absolutely opaque walls, but with a diaphragmatic central aperture in front; the tube could be lengthened or shortened as required. When this was applied to the eye, it of course could be made to prevent any but central rays of light from reaching the retina; it cut off practically all those which could have passed through the ciliary body. As erythropsia, when it did occur under the use of this apparatus, was present over the whole area of retina exposed, Koster's theory cannot be regarded as probable. With his apparatus Birkhoff carried out some other investigations of interest, but not of importance in regard to the present question. Fuchs' explanation of red vision is still the most probable, viz., that it is due to exhaustion of the visual purple, though it may be true that ultra-violet light, which seems to be that which most readily produces erythropsia, does not attack and destroy the visual purple so much as other rays do.

W. G. S.

J. V. PATERSON (Edinburgh). Rust-Staining of the Ocular Tissues. *Edinburgh Hospital Reports, vol. vi.*

It has long been known that even a perfectly aseptic foreign body introduced into the eye, if it be even slightly soluble, is capable of setting up changes in the tissues which are due to its passing very slowly into solution, the resulting compound producing a degree of irritation which varies according to the nature of the salt; whereas absolutely insoluble materials, such as gold and glass, may remain permanently without causing any reaction whatever.

Paterson records some interesting observations which he has recently made in certain cases of this kind. In one case in which a particle of iron had remained in the eye for a period of ten months before enucleation, all efforts having failed to dislodge it as it was firmly fixed in the coats of the eye, the little fragment was not at all encapsuled, being covered only with a little fibrinous lymph. There were absolutely no signs of inflammatory reaction round about it ; though the whole retina was stained of a uniform brown tint, the optic nerve was not at all discoloured. Microscopically the deeper layers of the corneal epithelium showed a faint brown stain, as also did the (detached) retina. The whole of this membrane was tinted, but more especially the layers next the vitreous, and the nuclear layers. By using the Prussian blue reaction he was able to verify these points, and to demonstrate in addition the presence of iron in the iris stroma, and the epithelium of the lens capsule, but not in the capsule itself ; though Descemet's membrane was but faintly tinted, the loose tissue about the filtration angle was deeply stained, as well as the non-pigmented cells covering the ciliary processes and the pars ciliaris. The ciliary muscle, choroid, optic nerve and sclera were entirely free from staining.

In a second case, in which the foreign body had only been in the eye for two months, but in which there was more exudation, and the pupil was blocked, and consequently the conditions for extensive spread of the salts were not so favourable, the metal was not found over so wide an area or in such quantity. The corneal epithelium was absolutely free from reaction, but in the posterior layers of the cornea there was a little evidence of iron, and rather more in the tissue about Fontana's spaces. The anterior epithelium of the lens gave a very faint positive reaction, though the capsule over it showed none ; on the other hand the posterior portion of the capsule near the foreign body gave a copious reaction. In the cuticular layer covering the cells of the ciliary region there was iron, but none in the cells themselves. Between the cells in this region and in the pars ciliaris there was here and there a distinct blue line; in the retina the positive reaction was confined more or less to the internal limiting layer, and to a zone round the blood vessels, each one of which was surrounded by a blue ring. So beautifully was this carried out even with the capillaries, that their precise arrangement could be as clearly seen as in an injected preparation. Few of the stained vessels penetrated into the inner nuclear layer, but between that and the inner molecular the arrangement of loops was prettily shown. The remaining parts of the retina are practically free. The vessels on the disc also gave a positive reaction, but those beyond the lamina cribrosa showed none whatever, and the same was true of the nerve sheaths. In both cases the choroid remained entirely unstained.

Apparently, then, in any case in which a fragment of iron is introduced into the eye and remains there, slow degenerative changes are apt to follow at a later time; supposing that primary dangers are escaped, a number of such eyes are lost by detachment of the retina, which is probably secondary to an exudation into the vitreous; how much of the degeneration is due to the siderosis *per se* is still a little uncertain. Leber's view that the iron in solution, which is probably in the form of the carbonate (the carbonic acid being obtained from the vitreous humour), is oxidised by the oxygen from the blood stream, is somewhat borne out by the distribution round the vessels in the second case; the absence of staining of the optic nerve and its sheath is in accordance with the accepted view that there is but little exit of fluid from the eye by this route.

Care has to be taken in carrying out such an investigation lest one be deceived by the iron of the blood, which may give a reaction and cause the pathologist to be misled; for the means of avoiding such an error reference should be made to the original, in which an interesting *résumé* of previous papers dealing with the subject will be found.

W. G. S.

FRENCH SOCIETY OF OPHTHALMOLOGY.

October, 1900.

On the Early Perforation of Descemet's Membrane in cases of Hypopyon Keratitis.—M. Petit (Rouen). Both from experimental evidence and from clinical experience it has been customary to believe that Descemet's membrane possesses considerable resisting power, and does not give way in any case of perforation until all the corneal tissue overlying it has been eaten away. But Fuchs in his text-book expresses himself as differing from some other authors, and appears to consider as the usual type a form in which the precise contrary takes place, and the membrane gives way at an early stage in the process. This divergence of opinion is probably due to two facts, viz., that clinical evidence is somewhat equivocal, and that anatomical observations on ulcers in their early stages can very rarely be made. Before proceeding to the description of a case observed by himself, in which he was able to examine the eye anatomically, Petit proceeded to urge that all cases should be classified according to the nature of the infection leading to the hypopyon. The case referred to was that of a woman of 64, in whom the outer portions of both lids of the left eye were removed on account of a cancer, the gap being filled up at the same sitting by means of skin grafts. In spite of all care, however, the new flaps shrank somewhat, a small portion of the cornea was left exposed and a superficial ulcer formed ; at first there was no hypopyon, but later there was some pus, with an irregular pupil, and a small mass adhering to the posterior surface of the cornea exactly posterior to the ulcer, from which little streaks ran down into the hypopyon. Cultures taken from the floor of the ulcer and from its invading margin were alike unproductive, the eye was then enucleated and carefully examined. Sections made vertically showed that the ulcer affected about one-fourth of the height of the cornea, and one-third of its thickness. It is not necessary to transcribe all the record of the appearances of the ulcer microscopically, the chief point is that wherever it could be distinctly followed Descemet's membrane was intact, but opposite the ulcer its endothelium was gone. Over all this area there was lying in contact with the membrane a dense mass of leucocytes from which various trails ran down into the pus, and among the leucocytes remains of the endothelium were to be seen. At no point was any perforation of Descemet's membrane to be found, or even any track of leucocytes passing through it. Bacteriological examination gave no results which could be regarded as decisive.

Some authors, as has just been mentioned, have regarded perforation of Descemet's membrane as an early and important feature of hypopyon keratitis, those who do so being divided into two schools, viz., those who regard this perforation as occurring from before backwards, and due to what has been called a posterior abscess of the cornea ; and those who consider it to be due to a process working from behind forwards, these last relying a good deal upon appearances presented in certain cases in which, however, glaucoma was a feature. Petit drew attention to the fact that unless great care be taken in the cutting and preparation of the sections, a false appearance of perforation may readily be produced, as indeed has been previously pointed out by others ; and it is to this fact that the author thought the mistaken opinion of the holders of the early perforation theory is due. Elschnig, whose paper was largely quoted by the author, has suggested that the well-known sterility of the pus in such cases is an argument in favour of a perforation from within, but Petit could not accept this ; he (Elschnig) also thinks, in contradistinction to Verdese, that the posterior abscess in the cornea is secondary to such perforation and not a cause of it ; he has also remarked upon the fact that on puncture of the cornea in such cases, while some of the contents of the anterior chamber escape at once, part remains adherent to the posterior surface of the cornea, and appears as though lying in a pocket there, from which it can only be dislodged by means of forceps.

On review of the literature of the subject, then, it did not appear that the occurrence of early perforation corresponded at all with the extent or depth of the loss of substance of the cornea proper ; it was not the necessary accompaniment, in other words, of any certain depth or extent of loss of corneal tissue. Nor did it appear that it was associated with the presence of any one or other of the pathological organisms specially ; Silvestri, however, finds early perforation to be accompanied by the presence of staphylococci, though others have not the same experience.

On the whole question Petit concluded : (1) That the cases supposed to prove early perforation are at least open to criticism. (2) That it is not certain that early perforation of Descemet's membrane leads to total perforation of the cornea, though Fuchs seems to take this for granted. (3) That in the cases of early perforation, hitherto described, the eyes seem to have all been affected with glaucoma absolutum, so that the integrity of their anterior parts must be matter of uncertainty. (4) That the lesions of the iris described by Nuel do not appear to be at all frequent, and may be of glaucomatous origin. (5) That careful efforts should in future always be made to determine the relation between definite organisms and definite types of the disease.

NOVEMBER, 1900.

Spontaneous Expulsive Hæmorrhage.—M. Terson related the case of a patient who had suffered from this rare accident, and who had been under his care. It was that of a woman of 71, whose right eye was normal, but whose left had had chronic glaucoma for eight years ; at intervals it had been painful, and for the last year or so quite blind. Up till March, 1900, when she first consulted Terson, treatment appeared to have been confined to the use of myotics. When she consulted Terson, he found the cornea to be completely ruptured vertically, and the contents of the globe protruding so much as to prevent closure of the lids ; neither heart nor blood-vessels showed any abnormal condition. On the previous night, just after retiring to bed, the patient had felt violent pain in that eye, which had soon subsided, but about an hour later she awoke to find that hæmorrhage had taken place from it. This was so copious as to soak several napkins, and its oozing was still going on when Terson saw her. He cut off all that had passed the lips of the corneal rupture and was still hanging there, and without suturing, applied compression, with iodoform vaseline. In about a fortnight the wound was completely and soundly healed, leaving an excellent stump for the adaptation of an artificial eye, being quite painless even on firm pressure. Formerly the only treatment thought right in such a condition was enucleation, which Terson considered to be unnecessary in this case, and even evisceration was not, in his opinion, at all times called for. A great deal, it seemed to him, must depend on the condition of the eye in the individual patient, on its quiescence or irritability, and too stringent rules-of-thumb ought not to be laid down. Such cases are very rare at any rate, and each must be judged on its own merits.

M. Abadie considered that in cases of hæmorrhagic glaucoma the proper procedure was to attack the sympathetic in the neck such accidents were then much less likely to occur.

M. Valude did not at all agree with Abadie's recommendation : so far as his experience went, he did not think well of sympathectomy in hæmorrhagic glaucoma. In cases of expulsive hæmorrhage after extraction (to which some of the previous speakers had referred), his view was that the best treatment was neither enucleation nor evisceration, but at once to apply a suture closing up the wound. He thought it probable, as Morax suggested, that there had just previously been ulceration of the cornea, which had favoured the sudden hæmorrhage.

Congenital Ectopia Lentis.—M. Duboys de Lavigerie showed a child, aged 8, who presented this condition bilaterally, along with disseminated choroido-retinitis. He regarded the condition as somewhat rare. There was strong evidence of syphilis, the child being the last, and only one alive, out of five pregnancies, the others having miscarried, been still born, or died in infancy; the girl had typical Hutchinson's teeth.

The Influence of Iridectomy in Glaucoma.—M. Jocqs summed up his experience of the value of iridectomy thus: In acute glaucoma secondary to occlusion of the pupil, the effect of iridectomy is immediate and always beneficial, because it re-establishes interchange between the two chambers. In acute primary glaucoma, iridectomy is also eminently satisfactory (provided it is performed sufficiently early), and for the same reason. The general increase of tension has produced a closure of the way of communication by the pupil by compression of the iris against the lens, iridectomy re-establishes the channel and permits of absorption by the angle and by the anterior surface of the iris. Similarly in subacute secondary glaucoma with recurrences the effect is beneficial, provided the process has not gone so far as to interfere permanently with the absorptive power of the tissues at the angle. In none of these conditions can sclerotomy have any other than a temporary influence. In chronic glaucoma, if the tension be raised, iridectomy is of value, but not unless. Jocqs's view was that the crux of the whole matter was the opening up of the "trap-door" of the iris and pupil.

M. Abadie expressed the opinion that no one nowadays regarded glaucoma as due to an obstacle to drainage by the corneo-ciliary angle; he believed he had been able to show that primary glaucoma was a disease, not of the eye, but of the sympathetic which innervated the vessels of the globe, and that it was not the removal of a portion of iris which did any good, but the section at the same time, which of course must of necessity take place, of the nerve fibres running in the iris tissue.

M. A. Terson regarded glaucoma as an acute œdema of the same nature as is to be seen sometimes in the lung and elsewhere. He believed that the superiority of iridectomy over sclerotomy was due to its establishing a more permanent open road, and that the explanation of the greater efficacy in acute glaucoma as compared with chronic, was that the disease attacked *was* an acute one, whose effects passed off, and not a slow and pertinacious affection.

DECEMBER, 1900.

Epithelioma of the Face.—M. Antonnelli described a case in which after fifteen years of comparative quiescence, a vast area of the face, including both eyes and their adnexæ, had been destroyed by the rapid growth of an epithelioma.

M. Chevallereau stated that he had seen remarkably good results from the use of methylene blue (1 in 10) in such cases, while in some others it had proved of no value whatever.

M. Darier had had some experience of methylene blue ; he thought it dangerous in acutely progressive cases, but had obtained good results in some others which were more chronic. He had had no success with chlorate of potass, but could speak highly of xeroform in such conditions.

M. Abadie had also had some success with methylene ; he would suggest Finsen's treatment, or that of Holländer with superheated air.

M. Terson spoke highly of chlorate of potass made into an ointment or injected subcutaneously.

Spontaneous Cure in Detachment of Retina in a high Myope.—M. Chevallereau related the case of a man with 16D. of myopia who had suddenly developed detachment of the retina a day or two previously ; he prescribed rest in bed, &c., but the patient would not submit, and in spite of the absence of all treatment, in about a month there was no trace of detachment. When seen four months later there had been no recurrence, and the field of vision was quite good.

W. G. S.

AMERICAN OPHTHALMOLOGICAL SOCIETY.

THIRTY-SIXTH ANNUAL MEETING, HELD AT WASHINGTON, D.C., 1900.

Dr. O. F. WADSWORTH, Boston, President, in the Chair.

[*Notes of some of the more important papers published in the Transactions.*]

An Operation for Atrophic Entropion, especially of the Lower Lid.—Dr. Ewing (St. Louis) describes a method employed by him in which the result is obtained on the principle of Green's operation.

The conjunctiva is incised close to the openings of the

Meibomian glands, along the inner edge of the lid margin, from the punctum to the external canthus, and reflected for 3 or 4 mm. in breadth throughout the length of the incision. Through the raw surface thus exposed, at from 2½ to 3 mm. from the lid margin, an incision is made through the tarsal cartilage for its entire length, and parallel to the lid margin throughout. The portion of the cartilage bearing the cilia is now turned forwards and maintained in position by three sutures introduced as follows:—Each suture is passed through the cut edge of the cilia-bearing portion of the cartilage at its orbicular margin, and the free ends brought forward over the edge of the lid. One of the ends is now passed under the skin of the lid, entering close to the eye-lashes and passing at right angles to the lid margin for 6 mm., where it is again brought to the surface through the skin. All three sutures having been laid in this manner, one at the centre of the lid and one to either side of the centre, a roll of moist gauze is now placed along the skin surface close to the margin of the lid, and over this the sutures are tied. By this means the lid margin is preserved in an everted position and the wound in the tarsal cartilage kept open. Into the bottom of this wound the free edge of the conjunctival flap is now fixed by fine sutures. On the third day after operation the sutures are untied and the roll of gauze removed. The subcutaneous portion of the sutures are withdrawn from their tracks under the skin. The free ends of the sutures are now fastened upon the surface of the cheek with contractile collodion so as to preserve the position of eversion of the lid margin. The conjunctival sutures come away after five or six days.

The chief difficulty in the operation is the dissection of the conjunctival flap, which is best carried out by a double-edged, round-ended, spatula-shaped knife.

Frontal Headaches, apparently Ocular, but really of Nasal Origin.—Dr. Ewing (St. Louis) describes the symptoms as follows:—Frontal headache, with congestion of the conjunctiva, increased in some instances by near work and sometimes by movement of the eyes, tenderness over the roof of the orbit, especially towards the nasal side in the neighbourhood of the pulley of the superior oblique, and sometimes in the course of the supra-orbital nerve.

Dr. Sluder (St. Louis), by invitation of the Society, gave an account of the "Nasal Conditions found in these cases; with especial reference to an abnormal relation of the Uncinate Process of the Ethmoid to the Bulla of the Ethmoid."

Dr. Sluder describes four classes of nasal conditions which may give rise to the symptoms described by Dr. Ewing:—

(1) Neuralgia of the ethmoidal or frontal nerves (branches of the fifth).

(2) Empyema of the frontal or ethmoidal sinuses.

(3) Mucocele of these sinuses.

(4) A probable closure of either or both of these sinuses from chronic catarrhal inflammation about their openings, or from some other cause, so that the air pressure within them is changed.

Dr. Sluder enlarges upon the importance of the last mentioned condition and points out how the infundibulum may become closed by juxtaposition of the bulla to the uncinate process, by hypertrophy of the middle turbinate bone, or by an abnormal position of its anterior extremity. Drawings of anatomical specimens are given. The appropriate treatment of the nasal conditions is also described.

Operative Treatment of Entropion by the Transplantation of a Flap of Mucous Membrane.—Dr. Weeks (N.Y.). The cases considered are those following upon trachoma. Dr. Weeks has found the Anagnostakis-Hotz operation unsuitable except in the milder cases of entropion. The Jæsche-Arlt operation he regards as inelegant, the Green and Burow operations are too often followed by relapse, and the Streatfield-Snellen operation is sometimes insufficient when used alone. The writer is impressed with the necessity for reconstruction of the lid margin in many cases, for which he employs a modification of the Streatfield-Snellen operation combined with the Van Millingen operation, canthoplasty being performed when required. In the lower lid he finds the Van Millingen operation sufficient. Mucous membrane from the lip is employed, as it is thought to shrink less than skin, and is free from hairs.

Dr. H. Knapp stated that he had practised the method described with excellent results for years, but thought skin was quite as good as mucous membrane, and may be taken from the upper border of the lid or from behind the ear, when hairs do not give trouble. Among others, Dr. Green spoke of his operation and how he had been led to adopt it. He regards Dr. Ewing's modification as a valuable method in the lower lid.

Removal of a Retrobulbar Lymphosarcoma with preservation of Normal Vision.—Dr. Charles A. Oliver's (Philadelphia) operation in the above case was carried out by means of a curved incision following the line of the upper orbital margin, and extending nearly the whole length of the superior palpebral fold, just above its sulcus. The parts were freely dissected so as to admit the finger, care being taken of the levator muscle. The tumour was found to lie partly within the cone of the extraocular muscles. It was multilocular, and to one of the lobes was attached the pedicle, which extended towards the apex of the orbit. Eighteen months after operation there was no evidence of any return of the growth. A very slight and undisturbing diplopia in the lower field was the only abnormal symptom which remained.

The Ocular Symptoms found in so-called Posterior Spinal Sclerosis.—Dr. Charles A. Oliver (Philadelphia) gives an interesting account of studies extending over five years, and of more than a hundred cases in which the diagnosis was established. With regard to the eye symptoms in the early stage, Dr. Oliver says there are slightly marked, though undeniably present, spastic movements of the extra-ocular muscles, together with normal or increased deep reflexes, especially the patellar. The optic nerve head is found somewhat swollen, and the edges of the disc slightly hazy. The retinal arteries, especially in the syphilitic type, show perivascular change, the retinal veins are more or less tortuous, and slight choroidal disturbance is manifest. This stage is followed by an intervening period of varying duration, in which improvement of all the appearances is present, after which optic atrophy comes on.

The disease is divided into two main types, the cerebral, or "optic type," and the "spinal type." The "optic type," of which the above account of early eye phenomena is characteristic, occurs in from 10 to 15 per cent. of all cases.

Leontiasis Ossea.—Dr. Robert Sattler (Cincinnati) gives an interesting account of the *post-mortem* examination in a case of leontiasis ossea, in which ocular symptoms were present. The lesion first became obvious when the patient was eleven years of age. Epiphora and stricture of the nasal duct were present from the beginning. At 15 years proptosis of both eyes, more marked on the left side; and at 19 years optic atrophy, more marked in left. Death occurred at 20 years of age from hæmorrhage at the base of the brain. The chief points of interest in the *post-mortem* appearances were the general thickening of the calvarium and orbital plates, and the compression of the brain. The sinuses were much reduced in the sphenoid, ethmoid and frontal bones, the left frontal sinus being filled up. The optic foramina were not contracted, nor were the other openings which give exit to important nerves and vessels.

On the Treatment of Dendritic Keratitis and of Marginal Ulcer of the Cornea with Tincture of Iodine.—Dr. Harry Friedenwald (Baltimore) applies the tincture of iodine in these cases with a small firm swab of absorbent wool on the end of a small piece of wood. The eye is prepared by the instillation of cocaine and a drop of fluorescine, after which the iodine is thoroughly rubbed over the ulcerated area until a distinct brown discolouration of the tissues is seen. The importance of thorough application is emphasised as quite necessary to good results.

Observations on some blind but quiet and apparently inoffensive Eyes. Do they produce a Pseudo-sympathetic Inflammation?—Dr. S. C. Ayres (Cincinnati) reports six cases in which disturbance of the sound eye took place many years after sight had been lost in the other eye. He says that in these cases the disturbance bore no resemblance to true sympathetic ophthalmia, as the attack upon the sound eye involved the posterior portion of the globe and not the anterior. Exudations into the vitreous were present in five of these cases, and in one hæmorrhage in the region of the macula. In the five cases operated on there was relief after the enucleation of the blind eye, and an improvement, if not a complete restoration of vision. In the sixth case the blind eye was not removed and the exudations into the vitreous disappeared under treatment, but the question remains as to whether this patient may not again suffer from another attack.

Primary (Traumatic) Non-infective Thrombosis of the Cavernous Sinus.—Dr. Herman Knapp (New York City) gives the following account of this case. Five weeks prior to the first examination the patient received a stroke upon the left upper orbital margin and eyeball with the end of a billiard cue.

Condition on Admission.—The lids swollen, the eye pushed forwards and downwards, its mobility restricted. Patient counts fingers at 20 feet; fundus, tension, and pupils normal; media clear; periphery of optic disc and adjacent retina swollen; veins engorged, dark-red (thrombosis of central vein ?); no hæmorrhage; arteries and veins pulsate on strong pressure; the upper lid hangs as an inert, dark-red mass of flesh over the eyeball; it feels soft on the nasal side, hard and somewhat uneven on the temporal. The patient is somewhat apathetic. For years his hearing has been defective on both sides. His tympanic membranes show evidence of old purulent otitis media, but are quite free from present inflammation. The right ear is completely deaf, the left partly so. The diagnosis is: injury of the roof of the orbit, possibly a fissure with effusion of blood and serum, yet as there is no sub-conjunctival hæmorrhage noticeable, the presence of traumatic sarcoma is thought of. Patient is ordered to remain in bed on sustaining diet.

Course of Disease.—January 2, 1900.—Considerable chemosis temporal margin of lid free; the other parts ill-defined and swollen; no tenderness on palpation.

January 5.—Fingers at 5 feet; less swelling of lids and conjunctiva.

January 6.—Fingers at 8 feet, veins of retina dark and swollen, arteries and veins pulsate on light, and empty on strong pressure.

January 8.—Optic disc and retina more swollen, chemosis on lower side greater; fingers at 4 feet, excentrically.

January 9.—Neuro-retinitis—hand movements only.

January 10.—Pupil large, fundus reflex normal, no details recognisable, left eyeball immovable.

January 21.—The skin of the left side of the face, the anterior half of the forehead and scalp, the anterior surface of the left auricle, show diminution of sensibility; cornea sensitive, but dull at lower part, which is exposed.

January 30.—Keratitis from lagophthalmos.

February 18.—Condition of lid and conjunctiva the same, patient more apathetic, the whole region of the skin supplied by the sensory branch of the fifth nerve is now anæsthetic; cornea sloughing; iris prolapsed. Temperature 98·6; pulse 68, normal in character. Sensibility of mucous membrane of nose and mouth preserved. Slight discharge from right ear at times, more from left, no signs of inflammation in either ear. The diagnosis of thrombosis of the left cavernous sinus was now made, probably caused by fissure of the roof of the orbit with injury to the sinus.

February 21.—At 2 p.m., when the ward visit was made, the right eye was normal; at 4.30 p.m. of the same day, when the patient was again examined, œdema of the conjunctiva, lid and neighbouring skin were present. Slight but distinct proptosis with swollen retinal veins. Tension, vision and fundus normal. These symptoms diminished later but re-appeared again. It was now considered certain that the case would follow the course of similar ones on record if not interfered with, and operation was determined on. Dr. Frank Hartley performed the operation and followed the same method (beginning with a horse-shoe shaped incision in the temporal region) as is employed by him in the extirpation of the Gasserian ganglion. The cavernous sinus was incised and cleared of clot. The circular sinus and superior petrosal sinus were investigated with a fine probe, and were seen to bleed. No blood came from the ophthalmic vein. The walls of the cavernous sinus were now allowed to fall together, a small strip of gauze was placed against them and over the entrance of the circular sinus, the end being brought out of the wound so as to be easily removed later.

At the conclusion of the operation the condition of the patient was regarded as satisfactory.

Subsequent History.—There was no affection of the right eye, which remained normal in every respect. The left eye sloughed, the tumour continued growing steadily, the malignant nature of the growth soon became evident, and the diagnosis of traumatic sarcoma certain. In agreement with the general opinion that these tumours are never cured, Dr. Knapp advised against any further operative interference.

The patient died on May 16, 1900, and the autopsy confirmed the diagnosis. Dr. Knapp notes that Panas advises against operation, as only one case had been operated on before (by Horsley) and the patient had died eleven hours after operation.

Relative Accommodation and Convergence, with the Description of an Instrument for their Measurement —Dr. Lucien Howe (Buffalo). As shown by Donders, disturbance of the physiological relationship between accommodation and convergence is the great cause of asthenopia. It is pointed out that in consideration of the fact that the eyes are so much used for near work, it is important to be able accurately and conveniently to estimate the relative convergence and accommodation for the "near-point." The instrument arranged by Dr. Howe for this purpose he calls the "opto-dynamometer," and though constructed on the principle of the original optometer of Donders, it has been so frequently modified in the course of its construction as almost to represent a new instrument. The following are the advantages claimed for this instrument by Dr. Howe as compared with forms previously used :—

(1) In the general plan of the instrument.

(2) In the selection of the radius of the arc through which the lenses are moved as the convergence of the visual axes increases.

(3) In the method of bringing the glasses before the eyes.

(4) In the object used for testing the accommodation at various points.

(5) In the addition of revolving prisms for testing the relative convergence as well as the relative accommodation at various points.

(6) The more exact fixation of the head.

(7) A more convenient visuometer.

(8) In the construction of a chart, showing at a glance the angles of convergence at all metre-angles, from the minimum to the maximum degrees possible.

A full and detailed description of the instrument is given with a drawing. Dr. Howe concludes by expressing the opinion that the complete chapter on muscular dynamics remains yet to be written. He believes that the views of Donders and Nagel will receive confirmation from any additional work which may be done, and recommends the "opto-dynamometer" for consulting-room and laboratory use as convenient and accurate.

Dr. Lippincott's (Pittsburg) paper on "The Advantages of Strong Portable Magnets in Eye Surgery," was published in the OPHTHALMIC REVIEW, 1900, p. 241.

A. H. H. SINCLAIR.

CLINICAL NOTES.

TRAUMATIC VARIX OF THE ORBIT; LIGATURE OF COMMON CAROTID ARTERY.—C. A. Oliver reports the case of a man aged 27, in whom a condition of pulsating exophthalmos was cured by ligation of the common carotid artery. The sight was lost by the supervention of secondary glaucoma.

The eyelids became swollen on the third day and the eyeball proptosed on the fourth day after a blow or kick on the left eye. These symptoms were followed by a "constant buzzing with some pain" in the left temporal and aural regions. There was also a history of injury to the head, when aged 4, followed by bleeding from the mouth, nose and ears.

On examination the upper lid was greatly swollen and œdematous, the ocular conjunctiva showed intense chemosis, the eyeball was pushed directly forwards and almost immobile. The cornea was clear, pupil inactive, vision $= \frac{1}{8}$ (the eye had formerly squinted). The retinal veins were enlarged and tortuous and very dark; there were no retinal hæmorrhages. There was a marked bruit in the left temporal region, synchronous with the radial pulse, but no bruit could be heard over the orbit.

Digital compression of the left common carotid artery was followed by slight subsidence of the palpebral and conjunctival stasis, and by recession of the eyeball, which became prominent again as soon as the pressure was removed. The exophthalmos and the œdema increased in spite of digital and mechanical compression of the carotid, carried on for eleven days.

The left common carotid artery was tied by Dr. Thomas Morton, one month after the date of injury. The ligature consisted of three strands of twisted silk; and almost a quarter of an inch of the vessel was included in the ligature. No untoward symptoms followed the ligation of the vessel. The pulsation and bruit entirely ceased, and the eye settled back into the orbit. Six days later the exophthalmos had become much less and the palpebral and conjunctival œdema had so far subsided as to allow movement of the upper lid. The retinal veins were no longer swollen, but a few retinal hæmorrhages were found in close relation to the veins. Vision was $\frac{1}{10}$.

Five months after the operation the man returned and stated that the eye had gradually become blind. It was then in a glaucomatous state, and the lens cataractous. The swelling of the lids and conjunctiva had entirely disappeared.—*American Journal of Medical Sciences*, March, 1900.

IODINE OINTMENT FOR CHALAZION.—As an application in cases of chalazion, Strzeminski recommends iodine, made into an ointment with potassium iodide, lanoline and water, of strength about 16 grains to the ounce. He employed this at first only as a palliative measure in patients who were too timid to permit the little operation of clearing out the cyst, but finding it answer very well in a large proportion of cases, he now makes use of it in all. The ointment should be well rubbed in, and left on all night.—*Recueil d'Ophtalmologie*, August, 1900.

HEMIANOPSIA.—The attention of Liepmann was called to the fact that if he asked a certain patient who was suffering from hemianopsia to divide a vertical line into two equal parts he did so quite correctly, but when the line was horizontal, the patient, who was blind to the right side, always made the right half smaller than the left. This led the writer to investigate the abilities of other hemianopes, with the result that he found this peculiarity marked in all of those whom he was able to test. They did not all make the mistake at every trial, but did so in more than 80 per cent.; in only about 9 per cent. of the 600 trials which his few patients underwent was the error in the opposite direction. One might at first sight very naturally suppose that the error would be exactly the opposite way; that a man, namely, suffering from right hemianopsia, would fail to observe the full extent rightwards of the line without moving the eyes along it, and would therefore, imagining it to be shorter than it really was, bisect it at a point too much to his left, but as above indicated such is the precise contrary of what he as a matter of fact does do. He so places the dividing line that the right "half" is the shorter. One of Liepmann's ten cases was of bitemporal hemianopsia, and this patient made the left half too small when using his left eye, and the right when using the right. As regards explanation, it was at first suggested that along with the hemianopsia there was enfeeblement of the muscular movements to that side, but this is evidently untenable, for it is not common to find any muscular defect along with hemianopsia. Might it have to do with the position in which the head is held in hemianopsia? Apparently not, for healthy individuals, holding their heads in the appropriate position, did not commit the error. The real explanation probably is that, in the case of a right hemianope, for example, the sensory impulse inviting movement to the right is reduced to a minimum, and therefore the corresponding expenditure of motor nerve power required to induce the eyes to move in the blind direction is greater than is normal. The effect of this in estimation of distance will be similar to that of a paresis of movement in that direction, though less in degree; the patient, namely, will imagine the movement to have been greater, and the line consequently to be longer to the right than it really is. He will therefore place the supposed middle point too much to the right, and the right "half" of the line will be shorter than the left.—*Berliner Klinische Wochenschrift*, 38, 1900.

CASES OF CONGENITAL WORD-BLINDNESS (INABILITY TO LEARN TO READ).

By E. Nettleship.

In *The Lancet* of May 26, 1900, Dr. James Hinshelwood published the cases of two children who could not learn to read, although in each instance immense trouble had been taken for several years, by schoolmasters and private tutors, in trying to teach them. The boys are described as being bright and intelligent, and in general terms as not behind their fellows of corresponding age, except in this one particular, that they could not learn to read; indeed, one of them is spoken of as having an unusual power of remembering words that he had heard spoken. In the first case the subject, a boy aged 11, after having been at school for four years, was sent away simply because he could not be taught to read. When Dr. Hinshelwood saw the lad he found him able to recognise by sight only a few of the letters of the alphabet, and unable to read any words at all, even of two letters; he had in fact scarcely any visual memory for letters. He was less defective, though still not perfect in reading numerals, but he recognised other objects, such as faces and pictures, quite well. He could, however, repeat the alphabet and also numbers up to 100 by heart, quickly and correctly, could spell short words given out orally, knew his school "reading book" by heart, though he could not read a word of it, and could do mentally simple addition sums; his auditory memory of letters, words, and numbers was therefore excellent.

Hinshelwood's second case was less severe. The patient, a boy aged 10, could read the alphabet and common small words (such as "the"), but less common words, however short (such as "tub"), he could read only after he had spelt them aloud to himself. He had done well in all his school subjects, except such as required reading, and it was observed that he never read for pleasure. Numerals, whether singly or in combination, he could read easily and correctly.

Hinshelwood quotes two other cases. In the first, published by Dr. Campbell Brown, a boy aged 14, after seven years of persistent effort at school and under tutors, could only just read words of one syllable. In the second, recorded by Dr. Bastian, a lad aged 18 had learnt to read with such extreme difficulty that his father had almost despaired of him. It is specially mentioned that in both these cases, numerals were easily read and arithmetic caused but little trouble.

Hinshelwood ascribes the difficulty to congenital want of visual memory; and this want of visual memory is due he thinks to an organic deficiency in the part of the brain where the visual impressions of letters and words are registered and stored. This admittedly speculative explanation he bases on pathological evidence from cases in which, death having occurred some time after sudden loss of reading power with or without other symptoms, especially hemianopia, changes have been found in the left supramarginal convolution and angular gyrus, which parts probably form "the centre in which are stored the visual memories of letters and words."

I think we are much indebted to Dr. Hinshelwood for drawing attention to the subject of congenital word-blindness. For though this condition seems to have attracted but little notice hitherto, it is, as he points out, not on that account necessarily, nor even probably, of rare occurrence; whilst if even moderately frequent, it has considerable importance.

I have myself been familiar with the condition for many years, thinking and speaking of it as congenital want of power to acquire knowledge by printed signs; but I have to thank Dr. Hinshelwood's publication for giving me a clear and accurate conception of its nature. My cases, though noted in much less detail than Dr. Hinshelwood's own two examples, will I hope be useful in the present rather early stage of our knowledge of the subject. They are as follows:—

CASE 1.—Master C. R. (P. 6, 101), aged 11, was brought in March, 1882, because he was extremely slow in learning to read and it was supposed that his eyes might be at fault. My notes, taken from his mother's account, state that "he receives information with ease, if conveyed orally. Reading is extremely difficult to him, yet he can pronounce words spelt out to him, and can spell fairly well words that are spoken to him. Immense pains have been taken in trying to teach him to read. He is very anxious to read, and will sometimes cry because he cannot see the words. He is a quiet, intelligent boy, fond of carpentering and planning, and he plays a good game of draughts. He sometimes has headache at the end of the day, and sometimes complains that his sight gets dim for a minute or two after looking attentively at things." I found that with each eye, and with both together, he read Snellen's types very slowly from No. 200 to No. 20 at twenty feet, and words of No. 1 Jaeger in the hand with extreme slowness and often only after spelling them; but I was surprised to find that his difficulty was quite as great with words of No. 10 J., and even No. 16 J. as with No. 1. It was not want of accommodation, for neither the size of the print nor the distance at which the book was held had any influence on the result. He knew some words pretty well, but unless he recognised a word at sight, he took a very long time to spell it; if, however, he was helped by having the word spelt out to him quickly, he pronounced it at once. The colour sense and fields of vision were normal, and the fundus healthy. After using atropine I found merely 1 D. of H. in each eye. I heard from his mother a short time afterwards, but have not seen the boy again, and have been unable to trace him.

CASE 2.—Master C. (P. 6, 167) was brought in 1882, because he had great difficulty in learning to read print, though he could read music well and showed considerable facility in drawing. He was said to read worse on some days than others, but this might be accounted for by his H., and the fact that he had been weakly as a young child. What puzzled his parents was that "he hardly knows even short words when he spells them; he takes in what is read to him, but not what he reads." I found that he saw $\frac{20}{20}$ with each eye and could read No. 1 J., though only by spelling it out; and that the larger types were not read any better than No. 1. "His manner of reading is more suggestive of incomprehension than bad sight." After the use of atropine I found 2 D. of H. in each eye, and the fundus healthy. I ordered + 1.5 D. for reading. (I hear that after "an enormous amount of patience and perseverance" this boy learnt to read easily, and he now reads both to himself and aloud with facility and pleasure. He is now a lawyer. February, 1901.)

CASE 3.—Master M. (P. 20, 3), aged 9, was seen in February, 1890, because he was so backward in reading, though in other respects he was quick and not at all behind other boys of his age. The difficulty in reading had been definitely noticed only since he had been sent to school, a few months before I saw him. I found that he read $\frac{6}{6}$ slowly with each eye, and spelt out No. 1 Jaeger with difficulty, and that various larger types were not read more easily. After the use of atropine I found H. 1·5 D. with 0·5 D. of As., but the cylinder did not help him appreciably. This case seems to have been a slight one of its kind.

CASE 4.—Mr. G. (P. 42, 103) was aged 23 when I saw him in 1897. His tutor said that he had always been "a slow reader, bad speller, and unable to do paper work."

For many years he had been taught orally, though he was able to read very slowly by taking pains; if he tried to read quickly he put the syllables of the longer words in the wrong order. He was unable to take in the name of a street, painted at the corner, as he passed it. He remembered words by sound, but could not reproduce them by spelling, and thus, though he had learnt well by ear and was considered, owing to the trouble that had been taken in teaching him orally, not to be deficient in general knowledge, he had great difficulty in reproducing words by writing. His faculties other than for reading were considered to be good. His incapacity for reading had been so great that during the previous fifteen years he had been taken to a great many oculists and to several physicians, in the hope that something might be done for his eyes or his brain; and that the case was probably one of imperfect development of certain cortical cells of the brain seems to have been first clearly expressed by a well known Swiss ophthalmologist. The patient was recommended by some to try systematic exercises in reading short words, but no one that he saw appears to have held out much hope of his ever being able to read easily. His visual acuity I found to be $\frac{6}{9}$ with each eye, and with + 1·25 D. cylinder axis vertical he read $\frac{6}{5}$; he had worn such spectacles, more or less regularly, since he was eight years old.

Case 5.—Miss L. (P. 47, 74), aged 21, was seen in July, 1898. She had always had such difficulty in reading that she had been taught almost entirely by ear. "In reading she put in words that were not there, and could not easily pass from one line to the next," apparently because she could not remember the appearance of the words in the line she had just been looking at. She had had no trouble with needlework. I found V. to be $\frac{6}{5}$ with each eye, and the refraction very slightly hypermetropic; the rod test at 5 m. showed no want of balance in the eye muscles. She is one of a talented and highly educated family, and is the only one who cannot read well; two of her brothers, however, stammer.

It will be noticed, as striking, that in this small series no less than eight of the nine subjects were males, but a much larger number of cases is required before any conclusion can be drawn as to a greater liability in one sex to this peculiar defect. The tendency to condone difficulty in reading in a girl, may have led to cases being overlooked in females.

Whatever may be the anatomical cause of this condition, its importance from the educational point of view, both positively and negatively, is obvious. If the defect be curable, the remedy will doubtless be found in methodical and persevering instruction in reading, begun at the earliest possible age, whilst the brain cells and fibres are still capable of marked development. Assuming some capacity for improvement, which may be expected to vary with the degree of congenital deficiency in the brain organ of visual memory, it may be that the old plan, by which the chief part of every child's early education consisted in teaching him his letters, would give a word-blind child a better chance of improvement than do some of the modern methods. On the other hand, if the defect be irremediable, the sooner this is recognised for each child the better, both for him and his teachers. It would seem therefore, that the best way of detecting congenital word-blindness, and deciding whether, and to what extent, the defective faculty can be improved, is to stick to the old plan of teaching children their letters as early as possible. The probability is that slight cases can be very much improved by early training; but several of the examples referred to above, or now given for the first time, seem to show that when the defect is great, even the best and most persevering efforts may be of little avail in developing the wanting faculty. In such severe cases, it may be best, after reasonable efforts have been made, to abandon the attempt at teaching the child to read, and to educate him on other lines.

The detection of congenital word-blindness is easy in the children of well educated parents, whose young children receive much individual attention. It must be much more difficult, both to recognise and deal with, in the children who crowd our Infant Elementary Schools. That the condition has been differentiated, and is receiving attention from medical men, should lead presently to its being dealt with by tutors who devote themselves especially to backward children, and by the teachers in all Infant Schools. The education of "backward" and "defective" children, by more or less special methods, is already receiving more attention than formerly. If from amongst such children, those can be sifted whose only, or principal difficulty is real inability to learn to read, the result cannot but be useful both to the individuals and the community.

REVIEWS.

LEBER. Conjunctivitis Petrificans. *v. Graefe's Archiv f. Ophth., li.* 1, 1900.

A case of disease of the conjunctiva presenting very unusual characters was described by Leber in 1895, under the name of conjunctivitis petrificans. In the present paper he describes the further course of his original case, together with two others of the same nature which have since come under his observation.

Case 1.—A girl of 20, who had suffered from corneal ulcers and discharging glands in the neck as a child, but was otherwise free from disease, began in 1891 to have white spots in the conjunctiva of the lower lids, with some surrounding inflammation, but with little accompanying pain or discomfort. The first ones disappeared in a week or ten days, leaving no trace; later attacks, which occurred now in one, now in the other eye, were of longer duration, and left behind a certain amount of scarring. She was first seen by Leber in January, 1894, during a relapse which affected the left eye for two months. The lower inner part of the conjunctiva bulbi, with the fornix and adjacent part of the tarsal conjunctiva, was converted into a firm thick white membrane, having a dry, roughish surface, and standing out in sharp contrast with the red and swollen conjunctiva surrounding it. A smaller patch of the same character affected the margin of the upper lid where it came most nearly into contact with the lower patch. In the right eye the palpebral conjunctiva was red and thickened near the lower fornix and presented here two small whitish spots. There was no discharge or irritation, hardly even any watering of the eyes, and the slightness of the subjective symptoms was in remarkable contrast with the apparently severe nature of the lesion present. The peculiar dry white aspect of the affected areas, resembling the eschars produced by nitrate of silver or acetate of lead, suggested the idea that the condition had been produced by artificial means; but prolonged observation of the patient in hospital proved the supposition to be unfounded.

The treatment adopted consisted in cleansing the eyes with weak mercurial lotion, applying warm compresses to encourage the throwing off of the white deposit, and scraping away the latter, so far as this was possible, once or twice a day. Some of the deeper portions, which were of stony hardness and very adherent, were removed by the knife. Although at first reproduced after each removal, the white material gradually diminished in amount, and in about five weeks the large sore had cleaned and healed up, leaving a relatively small scar.

Two months later the patient was re-admitted with a relapse, the left eye being again the most affected. The white deposit extended in this eye over the whole lower inner quadrant of the globe and the corresponding portion of the lower lid. In the right eye there was a roundish patch of it, 7 mm. to 8 mm. in diameter, in the nasal half of the lower fornix; it was movable with the conjunctiva, and apparently did not involve the subconjunctival tissue. This patch again so strongly suggested a lead deposit that it was excised and tested chemically for the metal, but with a negative result. The wound left by its removal was stitched up, but the stitches gave way, and the surface became covered with white exudation, some of which was already hard to the touch in two days' time. In the left eye, on the other hand, which was treated merely by sublimate lotion and warm compresses, the deposit rapidly decreased and had quite disappeared in three weeks; while there was still at this date a small hard portion remaining in the right.

After this attack there was an interval of six or eight weeks, when a renewed outbreak of considerable severity occurred, the right eye on this occasion suffering most. And for three years longer the disease continued to break out at intervals before it appeared to have finally worn itself out; even after this a slight attack lasting a few days appeared in the right eye two years later (July, 1899). The ultimate result of this protracted and apparently severe disease was an adhesion of no great extent in each eye between the globe and the lid.

Histological Examination.—The material scraped from the surface of the affected area consisted partly of shed epithelial scales and partly of conjunctival tissue, both impregnated with an opaque white substance. The central portion of the area was denuded of epithelium, leaving here the petrified conjunctival tissue exposed; but towards the margins there were abundant masses of fattily-degenerated epithelial cells, recalling the condition of xerosis, although the so-called xerosis bacillus was not found. The altered conjunctival tissue had in parts an appearance and consistence somewhat like that of amyloid degeneration, but the more fully petrified portions were of a curdy white aspect and stony hardness, and could only be broken up with difficulty. The presence of lime in the tissue was readily demonstrated by the abundant development of octahedral crystals on treatment with oxalic acid. Hydrochloric acid cleared the tissue with liberation of bubbles of gas; and molybdate of ammonia gave a yellow reaction; so that the lime appeared to exist, in part at least, in the form of carbonate and phosphate. But it differed from ordinary calcified tissue in that it was completely cleared up by solutions of caustic alkalies, from which Leber infers that an organic base, possibly spermin or an allied substance, formed an essential ingredient in the calcifying material.

In microscopic sections three layers were distinguishable, running parallel with the surface and corresponding with varying degrees of the necrotic change. The superficial, or petrified, layer was characterised by its glassy, swollen, nearly homogeneous appearance, the outlines of the greatly swollen connective tissue bundles composing it being only faintly visible; nuclei were absent, except for those of a few wandering leucocytes; blood vessels were only distinguishable in its deeper portion and were filled by hyaline masses in place of blood cells. A few sheaf-like groups of crystals were present. The whole layer was resistant to stains and evidently completely necrotic. Beneath it was a narrow boundary zone in which the process of calcification appeared to be going on; the connective tissue bundles in it were swollen but still well defined and stained deeply with hæmatoxylin, and it contained, more abundantly than the former layer, groups of crystals, acicular and tufted. The deepest layer was simply sub-conjunctival tissue infiltrated with round cells and traversed by engorged blood vessels.

The special stains for demonstrating micro-organisms were used without success; and cultivation and inoculation experiments proved uniformly sterile.

Case 2 was that of a widow, aged 38. She had been scrofulous as a child, and her husband had died of phthisis. Since 1895 she had been almost continuously under treatment for relapsing phlyctenular conjunctivitis of both eyes, but especially of the right. Occasionally there was some marginal keratitis with an episcleritic patch in this eye, and towards the end of 1896 there appeared from time to time on the plica semilunaris and edge of the lower lid small whitish patches looking as if they had been produced by caustic. In April, 1897, a patch of white diphtheritic-looking membrane appeared on the lower inner part of the right globe and gradually increased to the size and thickness of a sixpence, while another patch developed on the edge of the lid in contact with it. There was no swelling of glands, no exanthem, no fever, no known source of diphtherial infection. After five days improvement began, and the membrane was gradually thrown off. A few weeks later, swelling and redness of the lids of the right eye came on, with muco-purulent discharge. The lower inner third of the conjunctiva bulbi was found to be greatly injected and swollen, and presented a yellowish-white patch, 10 mm. by 5 mm., which did not lie on the surface, but had the appearance of an infiltration of the superficial layers of the conjunctiva itself. A similar patch was present in the greatly inflamed conjunctiva of the lower lid, and a third on the inner surface of the upper lid near the free margin. The reaction of the affected spots was strongly alkaline, more so than the normal conjunctiva of the other eye. A piece cut out for examination was found to be distinctly hard, recalling the condition in the former case. Culture tests gave no result, or only a growth of staphylococci; and implantation in the conjunctival sac of guinea pigs was followed by no reaction.

Of the many modes of treatment which were tried, the most useful seemed to be the dabbing of the patches with lemon juice; but though the spots disappeared for a time it was only to reappear again in the same or in fresh situations, and it was nine months before the eye was free from disease, the last patch having been treated by incision. Unhappily, however, the left eye now began to be attacked, the disease appearing in exactly the same form and in the same situations as in the right; but on the whole in somewhat milder degree. For about a year attacks of no great severity continued in this eye, when a more serious aspect was given to the case by the commencing involvement of the cornea, the lower inner margin of the latter presenting at this time a shallow ulcer with a whitish uneven surface. A further advance occurred before long, and in three months nearly the whole cornea was infiltrated and opaque; perforation subsequently took place, with secondary glaucoma as a result. Meantime the conjunctival condition gradually improved, and the eye became quiet, with a partial symblepharon between the lower lid and the globe.

In the beginning of 1900 the right eye, which had remained free for two years, began to show a fresh access of the malady. At the end of March the condition was as follows: the lids were swollen, hot and red, and could hardly be opened, but there was little secretion from them. The greater part of the conjunctiva of the globe was converted into a yellowish-white, opaque, slightly prominent mass of firm consistence; it could not be pinched up with forceps: the cutting away of small pieces gave no pain, although the globe was tender. The lower lid, and as far as could be seen the upper also, were infiltrated with the same whitish substance, which involved also the skin margin as far forward as the lashes. The cornea was opaque and partly vascularised, but did not at this time present any of the white deposit.

In sections of the affected conjunctiva could be distinguished, as in the first case, a superficial layer of nearly structureless necrotic tissue and a deeper layer of merely inflamed and hyperplastic connective tissue. The superficial layer stained for the most part faintly with hæmatoxylin, but here and there small defined patches took on an intense colouration indicating a further stage of the calcifying process. The presence of an excess of calcareous salts in the whole necrotic layer was easily demonstrated by means of oxalic acid. Cultures and implantation experiments gave negative results.

The attacks of inflammation of the conjunctiva in this case were on several occasions accompanied by the development of crops of vesicles, like those of herpes, about the lids.

Case 3 was a milder one than either of the others. A girl of 16, apparently healthy, had had inflammation of the left eye for a week. The lower lid was slightly puffy, its conjunctiva somewhat red and swollen, but smooth except for an area about 5 mm. long in the middle of the lower fornix, where there was a yellowish-grey deposit in the superficial layers, looking like an eschar ; around it were several smaller grey spots in the conjunctiva. There was very little discomfort. A month later she was taken into hospital, as it was suspected that she was producing the condition of the lid by the application of caustic. Shortly afterwards the patch was excised. Two months later, after a considerable amount of treatment by zinc, silver, lead, and occlusive dressings, there were still numerous small grey scale-like deposits in the surface of the conjunctiva which could not be removed by wiping. As the symptoms were slight all treatment was stopped. In another month the spots had disappeared and except for a little thickening of the fornix the condition was normal.

Microscopic examination of the excised patch showed the epithelial layers increased, the connective tissue beneath thickly set with cells, which contained in their interior colourless, highly refracting granules, often causing great increase in the bulk of the cell. Chemical tests showed these grains to be of a calcareous substance, in which the lime was united with phosphoric acid and an organic base. Scattered through the connective tissue and also in the epithelium, were groups of slender yellowish crystals, which also appeared to be calcareous in nature. In places there was a certain amount of hyaline swelling of the connective tissue bundles, but no real necrosis.

The disease seems to be of the greatest rarity. Leber has been able to find no more than three, or at most four, cases, which can reasonably be supposed to have been of the same nature as his own. The first was published in 1669, the second in 1704, the third and most carefully described by v. Walther, in 1820 ; after this, for over half a century, no case was recorded.

Certain resemblances to herpes iris conjunctivæ and to chronic diphtheritic conjunctivitis are to be noticed; but in its most essential characters it still stands alone. Leber evidently inclines to the belief that it is of microbic origin, but all his efforts to find a micro-parasite have so far failed. One may smile at the reporter of the first case, who came to the conclusion that his patient must have been bewitched; but we must admit that the question of the pathology of the disease is not yet wholly solved.

W. G. L.

COPPEZ (Brussels). **Optic Neuritis produced by Thyroid Extract.** *Archives d'Ophtalmologie, December,* 1900.

In the paper which Uhthoff read at the Paris Congress, dealing with the subject of toxic optic neuritis (see OPHTHALMIC REVIEW, 1901, p. 33), he expressed the view that thyroid extract does not appear to have any power to produce optic neuritis or other visual disturbances, it being in respect of this point placed in a group which contains also jaundice, Addison's disease, &c. Practically none of the writers on the subject of thyroid intoxication make any mention of having noticed any ocular symptoms whatever, but this, as Coppez says, may be owing rather to the relation between the two not having been recognised, and in some instances to the patient dying before the symptoms became sufficiently manifest. He shows that it is possible in the lower animals to continue for a length of time giving doses so small as to provoke no other marked symptoms, but at the same time to cause optic atrophy. He relates as an example the case of a dog treated by means of thyroid tabloids for extreme obesity; the obesity departed, but sight was lost. For this same purpose, namely, the reduction of obesity, though the precise mode of its action is not yet known, thyroid extract has taken hold of the public, who buy it in all sorts of forms, as pills, capsules and what not. Coppez goes so far as to say that he knows of one fashionable *corsetière* in Brussels who recommends it to any clients who are too stout for fashionable ideas of elegance. It is easy to see that, with a drug so powerful in its effects, and at the same time so variable and so unreliable in its action, much harm might readily result. Coppez states that he feels astonishment that cases have not been found in literature showing visual symptoms as the result of thyroid extract, for both in ordinary practice and when treating dogs with this substance, he has seen grave disorders arise, and one must bear in mind how very frequent, according to him, is its employment nowadays. He goes so far as to say that he thinks the optic neuritis in some instances has been referred to totally innocent influences, or has been considered inexplicable, when it was really due to thyroid extract. From the symptoms present in the cases which he has observed, he would place thyroid-extract amblyopia in the first of Uhthoff's two groups, namely, that in which the principal features are a retrobulbar neuritis with a central scotoma—the tobacco-alcohol type. Often, however, the disc is a little more altered and hyperæmic, the veins distended and sinuous, and the arteries slightly blurred. Even when they exist, the ophthalmoscopic changes are but trifling in comparison with the severity of the subjective symptoms.

Up to the present time, Coppez has observed five cases of this condition, four of which were in women. The subjects were between 30 and 40 years of age, and each instance has occurred in a person undergoing treatment for obesity by means of thyroid extract: they had all been taking rather large doses, and the desired effect had been to a considerable degree produced, but no symptoms of thyroidism had been manifest which would have interfered with the drug being pushed. Amblyopia had only become recognised after the extract had been gone on with for some months; about the same time the patients had been nervous, sleepless, short of breath, and had lost appetite. Once the defect of sight was established it advanced somewhat rapidly, until in about a couple of months vision was reduced to about one-tenth of what it had formerly been.

At the same time the prognosis was favourable, for if the thyroid treatment be discontinued, vision improves again, and may return to normal. This will be a slow process if the vessels have become at all attenuated, but under nux vomica, the continued current, and a tonic regimen, recovery may be looked for.

W. G. S.

E. GASPARRINI (Sienna). A Case of Sympathetic Ophthalmia cured by Injection of Anti-diphtheritic Serum. *Annali di Ottalmologia, Pavia, xxix.,* 5, 1990.

In order to investigate the question of the transference of inflammation from one eye to the other, Gasparrini adopted the plan of injecting into one eye of an animal a culture of the diphtheria bacillus ; by this means he provoked a local inflammation which appeared in the other eye as a neuritis optica, and in certain of the cases the changes involved also the ciliary body and choroid. It seemed to him, on examination of the specimens, that the probable route of transference was by the lymphatics of the nerve-sheaths. These investigations he reported to a learned Society in Sienna some time ago.

He has also recently had under his care a case which has enabled him to test, so to speak, the truth of this theoretical relationship between the diphtheria bacillus and sympathetic ophthalmia, while employing in the way of treatment the natural means which such a theory suggests—the employment, namely, of anti-diphtheritic serum. The case was as follows :—

B. N. presented himself in June, 1900, having lost the sight of the right eye twenty years before, from iridocyclitis ; he could give no account of how this had arisen, but it appeared to have been spontaneous. He certainly had had no illness at the time, and the only accident which he could recollect was a fracture of the leg. The vision of the left eye had been good until a month previous to his presenting himself, when it began to get dim, and the eye to water and become injected; for about a week he had not been able to see to work, but there had been no serious pain.

Examination showed that the right eye was injected all over the conjunctiva, that it was watery, and that the whole cornea was opaque, with a little yellowish point in the centre suggesting the presence of pus. In the left eye, the conjunctiva, cornea, aqueous, and iris were all normal, there was no circumcorneal injection. The pupil was black and reacted well, and vision was $\frac{3}{50}$. The disc showed a condition of neuritis, being reddened and having its edges blurred, while the vitreous and other media were clear; the field of vision was uniformly constricted. Gasparrini asked himself, as every one must in the presence of such a condition: Is this of sympathetic nature? or is it merely an accidental neuritis? He decided, as we shall see, that it was the former. Before beginning any treatment, however, he examined the conjunctival sac, whose appearance, and that of the right disc, recalled those of the rabbit when inoculated with the diphtheria bacillus. He obtained evidence of some colonies similar in all respects to those of the Klebs-Loeffler bacillus, which he found again after the first injection with the anti-diphtheritic serum. On June 19, the eye being in the state above mentioned, but rather more irritable, with some circumcorneal injection and vision still $\frac{3}{50}$, 1,000 units of anti-diphtheritic serum were injected. Two days later the report states that the eye was looking and feeling better, the photophobia was less, and the disc showed diminution in the signs of inflammation. The injection was repeated, and a third was given two days after that; on the 27th vision was $\frac{5}{50}$, photophobia was nearly gone, the disc had returned to a condition almost normal, its margins were sharp and clear, and the early signs of a post-neuritic atrophy were beginning to show themselves; at the same time the field of vision was manifestly somewhat more extensive than it had been. Nevertheless Gasparrini considered it wisest to enucleate the other eye, which he accordingly did, and records that for the first ten days thereafter there was no further improvement in the condition of affairs. But subsequently, when the patient had been put on strychnine and treated with the continuous current, vision rose to $\frac{5}{60}$, and remained at that as its high water mark; the field also enlarged under that treatment.

Gasparrini's views on the subject of this case are next given in his article, and these we shall briefly indicate. He believes that the case was one of neuritis due to the action of the diphtheria bacillus, which had spread along the sheath of the optic nerve, there being evidence of neuritis in the disc and nerve of the enucleated eye. He is not *too* confident, he says, as to this being due without doubt to the action of the Klebs-Loeffler bacillus, since the culture examinations were not absolutely conclusive or unimpeachable, but, on the other hand, he points to the marked improvement which followed injection of the anti-diphtheritic serum, an improvement which was not added to by enucleation of the exciting eye, and which only increased when the patient was given general and local tonics. As regards the fundamental question, Was it a case of sympathetic origin at all? his opinion is distinctly that it was. There are, as he indicates, two very serious difficulties in the way of accepting this unreservedly, namely, the very long time (twenty years) which had elapsed between the injury and the sympathetic symptoms, and the absence of any sign of cyclitis whatsoever. In regard to the first of these objections all that he can say is that such instances of a long period of time having passed between injury and subsequent sympathetic mischief are not unknown in literature, and on the second point his defence is that in this particular instance the manifestation took place in the nerve instead of the uveal tract. Whatever else may be doubtful, the mode of transit, he says, is unquestionable.

While one cannot afford to pass by any suggestion for the treatment, or any workable theory as to the cause, of this distressing disease, it is hardly possible to hope that in Gasparrini's views there is much to assist one in dealing with sympathetic ophthalmia. It is impossible even to be reasonably sure that his patient ever suffered from this disease at all, indeed the account of the case as given by him and reproduced in brief above, does not satisfy the reviewer of the fact by any means. What is there to show that it was not a simple neuritis? And supposing for the sake of argument that it were so, the influence of the injections as a curative means is not strikingly obvious. Put the average hospital patient with recent sympathetic ophthalmia to bed in a hospital ward for a few days and feed him well, and he will improve as much without any treatment as this patient did. Gasparrini admits that even if he is right, one swallow does not make a summer, and that the method will require more extended trials before it can be regarded as within the range of practical politics; here we agree heartily with him, and one must have evidence a vast deal less equivocal before any confidence could be felt that injection of serum could possibly be of any avail. The three uncertainties are all too grave:—Whether sympathetic ophthalmia was present at all, whether any toxin was present, and Whether the treatment adopted had any influence whatever. A case which is to introduce a new era in treatment must be entirely above suspicion.

W. G. S.

ZIMMERMANN (Stuttgart). **Supra-renal Extract.** *Die Ophthalmologische Klinik. September*, 1900.

WOLFFBERG (Breslau). **Atrabilin.** *Wochenschrift fur Therapie und Hygiene des Auges, December*, 1900.

The employment of supra-renal extract is not now so very recent, but as it is still far from being generally utilised, the experiences of one who has made a serious trial of its value among numerous patients may prove serviceable. The preparation which Zimmerman has for the most part employed is that of Jacquet of Lyons, which reaches the consumer in little sealed glass tubes; it is a clear dark-brown fluid which has a rather disagreeable odour. When applied to the eye, whether normal or inflamed, the preparation, if quite sound, causes no irritation whatever.

In conjunctivitis of any form he has found the preparation valuable: by it the secretion is diminished, and the eye, which could only with difficulty be opened, now can be so quite readily. This wider opening is not accompanied, as it is apt to be when brought about by cocaine, with a feeling of tension in the eye; on the contrary, the sensation is quite agreeable. This feeling of increased comfort does not, of course, last very long, but a patient using the drops three times a day has little annoyance from a conjunctivitis, and in such cases Zimmermann has never seen any evil follow its employment. It must only be used with great caution, if at all, where the nutrition of part of the eye is insufficient, as in the case of a corneal ulcer, where he has certainly seen harm result from its use; he has seen a healing ulcer break down again and begin to invade neighbouring parts of the cornea. That may, of course, occur under any form of treatment, but Zimmermann thought there could be no doubt that the extract had helped to bring about this undesirable recrudescence in several instances before he had quite detected the cause. In certain other conditions, such as affections of the sclerotic and the episcleral tissue in which, nevertheless, supra-renal extract seems to be useful, even by very frequent instillations of it one cannot altogether obviate the feeling of irritation; the deep injection is apt to remain, though not in all cases, even when the superficial hyperæmia has all disappeared under the action of the preparation; but in this relation it should be stated that different brands of the drug seem to give slightly varying results. The author gives details of one very satisfactory case in particular in which a man of 47, who had suffered from very many repeated attacks of "uric acid scleritis," with much pain and tenderness, and with great hyperæmia and deposit in the tissues, obtained immediate relief by the use of supra-renal extract, though cocaine had failed to be of the slightest advantage. A few instillations of the extract reduced almost to *nil* the hyperæmia of the tissues, and caused the pain to become greatly abated. The condition was not thereby cured, it is true, but pain and discomfort were much alleviated, the patient was able to resume his occupation, from which he had long been cut off, and under suitable remedies presently recovered.

Landolt states that he has seen troublesome hæmorrhage occur after the use of supra-renal extract, but Zimmermann has had no such experience, and thinks that it must have been by a pure accident that Landolt had met with this complication. He has found the extract very useful, further, in reducing the risk and annoyance of hæmorrhage during lid operations; he advises its use in extractions only when one cannot avoid having a conjunctival flap containing numerous vessels (!) In operations for glaucoma, supra-renal extract not only renders the performance easier, but has some therapeutic value as well, and it may often with advantage be combined with a myotic. So far as his experience goes, the author is of opinion that the extract acts upon the tension only of eyes in which that is above normal, and is somewhat uncertain even in these, lowering the tension in one eye and not in another; he has never seen it raise the tension. One advantage of combining the extract with it when using eserine or pilocarpin is that the myotic can be used in much less concentration. Altogether Zimmermann's report on supra-renal extract is, for suitable cases, favourable though not enthusiastic.

Wolffberg's experiences with atrabilin, another preparation made from the supra-renal bodies, have led him to the following conclusions. About thirty to sixty seconds after it has been dropped into the eye, the conjunctiva becomes pale; this is naturally most readily brought about in a normal eye, but occurs also very distinctly in an inflamed conjunctiva. Even trachomatous pannus is decidedly lessened by it. Contrary to what other observers have found, he has noticed also a diminution in the injection of iritis and scleritis. The pupils are not altered, unless perhaps a very slight contraction occurs; it has some power of reducing tension. The secretion of the lachrymal gland is lessened. Though it has not of itself any anæsthetic action, it assists that of cocaine. By whitening the aspect of the sclerotic it has a distinct cosmetic action.

W. G. S.

SEABROOK (New York). **Heterophorias and Insufficiencies.** *The Knickerbocker Press*, 1900.

This is a little volume of some hundred or so of pages, written by one who, although, or perhaps because, he has made a close study of the subject of muscular abnormalities, has not allowed his judgment to be so much warped thereby as is the case with a number of his countrymen and others. The enthusiasm of some has, as we all know, led them to conclusions and to lines of treatment, as well as to assertions in regard to results, which are absurd enough, but it is to be hoped that our author is mistaken when he says (p. 26) that he knows of cases in which an eye has been removed for the relief of symptoms supposed to be due to heterophoria! Some of his conclusions we cannot quite accept, especially certain of his dicta on the subject of anisometropia; others are good, and particularly well expressed—a minor point perhaps, but one frequently conspicuous in medical works by its absence. Some of his epigrammatic phrases, too, are particularly sound and very happy—for example, when he says that statements as to relief of symptoms by a certain line of treatment are apt to be "a measure of the self-satisfaction of the man presenting them." His last paragraph is worthy of being reproduced entire. "It may seem that these and some other considerations herein presented have little, if any, direct bearing upon the ocular muscles. This book is not intended for those who can treat asthenopia successfully by ignoring the ocular muscles, or those who can obtain the same happy result through these muscles alone." This sentence shows the position adopted by the author:

while admitting that heterophoria is a potent and fairly frequent cause of much annoyance, he is not of those who teach that every ill that flesh is heir to, from mania to corns, is due to errors in the ocular muscles.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, JANUARY 31, 1901.

G. ANDERSON CRITCHETT, F.R.C.S.Edin., President, in the Chair.

Paresis of Divergence or Spasm of Convergence.—Dr. G. A. Berry took for the text of his paper the case of a man who developed a temporary diplopia with the following characteristics: a convergent squint well marked after work but diminishing after rest; the convergence more marked on distant than on near fixation; no interference with associated lateral or vertical movements; a degree of latent convergence much higher than the manifest; an approximation of the two images on lateral fixation to either side; a good power of fusion; and lastly, the total disappearance of all abnormal symptoms after a few days' rest. The case was an example of an affection which had recently received some attention, and been generally described as *paresis of divergence.* The main object of the paper was to prove that this diagnosis was incorrect, and that the real cause of the symptoms in these cases is *spasm of convergence.*

A curious feature in these cases was the diminution in the distance apart of the double images on lateral fixation. Evidently, if both external recti were paretic, the images, instead of being nearer together on looking to either side, would be further apart. Further, if the squint were concomitant, *i.e.*, if the same degree of over-convergence were constantly maintained as the eyes moved to one side, this would also be the case to a slight extent. The author took great pains to prove this point by a geometrical demonstration for which readers must be referred to the original paper. If, however, it is assumed that, as the eyes move to either side, the degree of convergence diminishes to the extent necessary to maintain the fixation of objects in a plane parallel with the eyes (as, *e.g.*, the page of a book), the separation of the two images would also diminish, as was actually the case in the class of cases under discussion. The inference was drawn that "in spasmodic convergence or paretic divergence the tendency to over-convergence is not so firmly established that it is incapable of being lessened under conditions in which strong convergent movements are not habitually called for. In other words, the effect of habit asserts itself more or less even when the conditions are peculiarly unfavourable. Just as we often see in cases of abducens paresis that the resulting double images are further apart on downward than on upward fixation, because of the habitual association of convergence with downward rotation, and the absence of any call for convergence when the eyes are directed upwards,—so we find a degree of abnormal convergence lessen when associated with wide lateral movements, as the association of convergence and marked lateral movements is not habitual under normal conditions."

So far as the consideration of such cases alone goes, it was not, in the author's opinion, possible to decide between the rival diagnoses of divergence paresis and convergence spasm. Other considerations, however, rendered the former diagnosis unjustifiable. He had seen the same condition of suddenly arising convergent strabismus followed, after a short time, by a persistent associated lateral deviation of the eyes of an undoubtedly spasmodic nature, which had also disappeared after some time. In the present case the very curious great excess of latent over manifest convergence for near fixation also pointed to spasm as the cause. The author went on to compare these cases to those known as spasmodic myopia which depended upon an excessive degree of accommodation varying according to the requirements of the moment. As to the supposed existence of a diverging centre, he had long ago pointed out that there were physiological and clinical reasons for rejecting the view that the cessation of convergence was brought about by active divergence, and therefore for concluding that no such centre existed. In this opinion the author had received the support of the late Professor Alfred Graefe. The two main arguments against the existence of such a centre were, first, the physiological one that the limit to the power of overcoming converging prisms coincides with the degree of divergence which is assumed when there is a complete loss of any converging power; —secondly, the clinical argument that in certain conditions of paralysis there is a complete loss of power of associated movement to one side without any interference with convergent movements, and with return to parallelism on convergence being relaxed. If it were attempted to account for these cases on the assumption of a divergence impulse remaining unimpaired in spite of the loss of conjugate movement, this assumption must surely break down before the not infrequent co-existence of complete paralysis of one externus with the power of bringing the affected eye back to the middle line on the cessation of convergence. This phenomenon must "either have a purely physical cause or must depend upon the resumption by the muscle of that state or that length which corresponds to its tonic innervation when opposed by the tonically innervated internus. That the latter and not the former is the true cause seems to me evident from the phenomenon of so-called secondary contracture of the antagonist in cases of ocular paralysis. This phenomenon may either slowly develop or be apparent from the outset. It is no doubt due to the loss, gradual or sudden, of this tonic innervation in the paralysed or paretic muscle. It is not due to any change which takes place in the innervation or in the physical state of the antagonist."

Dr. Berry also read a second paper *On Two Rare Forms of Non-paretic Non-concomitant Convergent Squint.*

(1) *Strabismus Fixus.*—In this rare condition the squinting eye was bound down in its abnormal position by extensive and deep-seated connective tissue attachments. The cases were not generally diagnosed until after operation, and yet the diagnosis ought to be easy enough. All that was required was to test whether the eye could be rotated outwards with fixation forceps.

(2) *Strabismus due to Defective Associated Lateral Movements of the Eyes.*—The author related a case recently seen of a boy who had been brought to him on account of squint. On looking straightforwards there was complete parallelism and binocular vision. On looking to the right, the left eye turned up and in to such an extent that the cornea was almost completely covered by the upper lid, and on looking to the left the right eye behaved in an exactly similar way. There was practical emmetropia and normal visual acuity. Though he had seen slight cases of a similar defect in a latent form, this case was in his experience unique.

Eclipse Blinding, with Obstruction of a Retinal Artery and Hæmorrhage into the Vitreous.—Dr. Rayner D. Batten read this paper. The case occurred in a woman aged 28, as the result of looking at the eclipse of the sun last June. There was a total loss of the lower portion of the visual field towards the nasal side, and a more or less corresponding diminution in the size of the upper retinal arteries, together with œdema of the retina, some hæmorrhages, some vitreous opacities and some choroido-retinitis.

In reviewing the literature of the subject, Dr. Batten referred to papers in the OPHTHALMIC REVIEW for January, 1894, by Mr. Mackay, and for 1895, by Dr. J. W. Barrett. In conclusion he referred to the prevalence among children of the dangerous practice of "sun-gazing competitions," though he found it hard to say why cases of injury from this cause were not more frequent. Possibly it might account for some of the obscure cases of amblyopia.

Mr. Lawford said he had seen three cases subsequent to the eclipse of last year, belonging to the more ordinary category, without any marked ophthalmoscopic change. All three cases had a slight central scotoma, and objects appeared distorted. The first patient had used blue glasses ; the second blue and then smoked glasses ; the third ordinary smoked glasses.

Mr. Jessop had seen three cases, reported in the *St. Bartholomew's Hospital Reports.*

Mr. Treacher Collins had seen two cases. In one both eyes were injured ; one recovered completely, while the other retained a permanent central scotoma seven years afterwards. The second occurred in connection with the eclipse last May.

Mr. Bokenham had seen one slight, and one serious case. In the latter the patient had used a blue glass. She had retinal hæmorrhages and a large scotoma. When last seen the disc showed marked atrophic changes.

Dr. Berry remarked on the deleterious action of the ultra-violet rays and the erroneous general impression among the public that there was safety in blue glasses. In Russia it was the custom to wear red or yellowish spectacles, not blue.

Mr. Johnson Taylor suggested that Dr. Batten's case might not be due to sun-blinding after all, and asked if there were any spots of keratitis punctata.

Dr. Batten, in reply, said that none had been detected. He had fully considered the possibility that it was not due to the sun, and had concluded that this view was untenable.

A Case of Bullet Injury of the Occipital Lobes, with loss of the Lower Half of each Visual Field.—The President read this paper. An English officer in South Africa sustained a bullet wound in the occipital region. He at once lost his sight, and half an hour later became unconscious. The comatose condition lasted eight days, and on the fifteenth day after the injury the patient was able to distinguish light. Vision slowly and steadily improved from that date. On examination the pupils and fundi were found normal. Visual acuity was $\frac{6}{6}$ and V. 1 in each eye, but the greater part of the lower half of each visual field was lost, the line of demarcation being irregular. "From the position of the scars and trephine holes it appears that the course of the bullet must have been through the anterior part of the right middle occipital convolution, and, as it passed backwards, it must have penetrated the right cuneus, and injured also the left cuneus at the apex of the left occipital lobe, quitting the skull 1½ inches above and slightly to the left of the torcular Herophili." So far as he was aware, no identical case had yet been reported, but a somewhat similar one was recently published in the *Lancet*, by Mr. Herbert Page.

Mr. J. Herbert Fisher read notes of three somewhat similar cases, all due to wounds received in South Africa. In the first there was typical right hemianopia ; in the second there was loss of the lower half of the visual field in the left eye and probably in the right eye also, though this last point was doubtful owing to the fact that the field was a functionally "spiral" one. In the third case the lower half of each field was undoubtedly lost. In all three cases visual acuity was good and the fundi were normal.

The following *Card Specimens* were shown :—

Case of Tuberculosis of Conjunctiva.—Mr. W. H. Jessop. This was a case which had been shown before operation at a previous meeting of the Society. It had now been operated on with a surprisingly good result.

Probable Frontal Mucocele.—Mr. Jessop. The interest of this case lay in its occurrence in a child of about 10.

Mr. A. P. Wells said he had had a case in a boy of 14 or 15 in which there was necrosis, and which terminated fatally, as did many cases where necrosis was present, on account of the infection of the diploe and consequent cerebral mischief.

Mr. Tatham Thompson had had a similar case, which had done well after incision and drainage.

Dr. Little had had cases in subjects as young as this.

Dr. Bronner suggested that the case might be one of dermoid cyst.

Dr. Berry suggested that before an incision an exploratory puncture should be made.

Concussion Injuries of the Eyeball.—Mr. J. B. Lawford. In this case there was a hole at the macula and a rent in a detached retina.

New Growth of Ocular Conjunctiva. (Papilloma.)—Mr. W. Lang.

Case of Spreading Opacity of the Cornea following Herpes Zoster.—Mr. W. T. Lister.

Specimen of Primary Sarcoma of Orbit.—Dr. A. W. Stirling.

Sections of Conjunctival Growth (from the case shown at the December meeting).—Dr. Rockliffe.

AMERICAN MEDICAL ASSOCIATION—SECTION OF OPHTHALMOLOGY.

[*Notes of certain papers read at the Annual Meeting held at Atlantic City, New Jersey*, 1900.]

PART I.

H. V. WURDEMANN (Milwaukee), Chairman.

Optical Treatment of Conical Cornea.—S. M. Burnett (Washington) emphasised the importance of a careful study of the cornea with the ophthalmometer and Placido's disc. He had not found skiascopy of very great value, but in almost all cases regular astigmatism was present, and must be corrected in order to secure the best vision ; hyperbolic lenses had not proved satisfactory in his hands. The same was true of conical lenses ; and contact lenses could not be generally applied in practice. In some cases stenopaic apparatus proved useful.

Surgical Treatment of Conical Cornea.—R. Sattler (Cincinnati) considered this justifiable in exceptional cases, to arrest increase in the protrusion, and more rarely to improve vision ; it was, however, attended with uncertainty and considerable risk. The simplest and least dangerous method was by the cautious use of a galvano-cautery, supplemented by an iridectomy, iridotomy or iridokleisis.

H. Knapp (New York) believed that the purposes of surgical treatment should be to render opaque the most irregular part of the cornea, and subsequently to make an artificial pupil behind the most favourable portion. The cautious and progressively deeper cauterisation with the galvano-cautery best effected the first object. He endeavoured to observe these two rules—never to cauterise too deeply, and to spare, if possible, at least half of the pupillary area.

Scrofulous Keratitis.—H. Gradle (Chicago) believed that this type of keratitis occurred only in individuals under the influence of poisons produced by the tubercle bacillus in one or more lymph glands ; four cases tested by tuberculin inject ions all gave positive febrile reactions. In phlyctenular disease it was often essential to treat locally the ocular, nasal or pharyngeal complications. Atropine was useful only in those cases in which the pupil seemed to resist its influence. For the more extensive lesions of later attacks he recommended the internal use of sodium salicylate. He gives one gram (= about 15 gr.) or upwards every two or three hours for an adult, and two-thirds of a gram (= about 10 gr.) four times a day for a 3-year old child; large doses were required, and small doses were useless. If no influence was perceived after its steady use for two days it was useless to continue it, and in favourable cases it might be omitted tentatively after a few days.

Protargol in Pyogenic Affections.—F. C. Hotz (Chicago) had found protargol as efficient as silver nitrate, and far less irritating. On this latter account it could be applied boldly, without fear of injury to the cornea, in cases of purulent conjunctivitis. It was equally efficient in suppurative inflammation of the tear-sac, and had done excellent service in suppurative keratitis; he had found it equally valuable in cases of pyogenic infection after operations. The results were largely governed by the strength of the solution, and the frequency of its application. During acute pyogenic inflammation it should be used in a solution of not less than 20 per cent., and applied at least twice in the twenty-four hours. It must be brought in thorough contact with the affected tissues. This was best accomplished by rubbing the surface firmly with a cotton swab saturated with the solution.

L. W. Fox (Philadelphia) obtained good results with protargol in gonorrhœal inflammations and in dacryo-cystitis. In serpiginous ulcers of the cornea and in granular conjunctivitis it had less value.

G. E. de Schweinitz (Philadelphia) had been very much impressed with the uncertainty of this drug. It was far more agreable than silver nitrate, but could do nothing that the nitrate could not do, while the latter did many things that protargol would not do. He had used it in 10 and 15 per cent. solutions.

C. A. Wood (Chicago) had much the same experience with it as the last speaker, but had obtained fairly good results in some cases of corneal ulcer.

C. F. Clark (Columbus) had had similar experiences with protargol; he had obtained excellent results in dacryo-cystitis.

Edward Jackson (Denver), as a final resort or dependence, would prefer silver nitrate, but protargol seemed more safely applicable to a larger number of cases. To most eyes it was very much less irritant than the nitrate, but he had encountered two cases in which severe irritation lasted for two days after the application.

W. F. Southard (San Francisco) testified in favour of protargol; he thought it of importance that the conjunctiva should be thoroughly cleansed before its application.

Frank Allport (Chicago) had also encountered cases in which protargol acted as an irritant. Its principal advantage was in the freedom with which it might be used. It could be given to the patient for use at home, in striking contrast with the nitrate; it was especially beneficial in affections of the lachrymal sac.

L. Connor (Detroit) had treated with it a large number of cases of purulent ophthalmia in children. Such cases had formerly been a source of very great anxiety, but with this agent not a single eye had been lost.

A. D. McConachie (Baltimore) had found protargol non-irritant, but also ineffective, and had gone back to the use of silver nitrate.

A. E. Bulson (Fort Wayne) found that in a majority of cases protargol could be substituted for silver nitrate in ophthalmia neonatorum ; he had also found it efficient in acute trachoma.

J. L. Hiers (Savannah) added his testimony in favour of protargol. He gave the patient a 5 per cent. solution to instil at home, and also made applications of a 10 or 15 per cent. solution once or twice daily.

Operations for Divergent Strabismus.— L. Webster Fox (Philadelphia) had found the following operation uniformly successful. After tenotomy of both external recti muscles the strabismus hook was introduced, first upward, then downward, and Tenon's capsule and the conjunctiva thoroughly stretched until the cornea was at the inner canthus. With retractor forceps a vertical fold of conjunctiva, and as much underyling capsule as possible, was raised midway between the caruncle and the cornea and cut off with curved scissors. Around the elliptical wound thus formed the conjunctiva was undermined in all directions and brought together by sutures. He aimed at producing by the operation a primary convergence of one to four millimeters.

Relative Accommodation and Convergence. — Lucien Howe (Buffalo) spoke of the variation in the positive and negative portions of the accommodation with any given degree ot convergence. Little has been done in this field, though the question is of some scientific and practical interest.

Edward Jackson found that tests for muscular equilibrium, made at the reading distance, gave valuable indications in the prescriptions for glasses. For example, esophoria at the working-point indicates a low amount of relative accommodation ; the patient is compelled to converge excessively to get sufficient accommodation.

S. D. Risley called attention to Donders' remark, that in the case of ametropes who have worn correcting glasses for a considerable time the curves approximate to those of emmetropia.

G. C. Savage (Nashville) urged that both the internal and external muscles should be tested in all cases.

(To be continued.)

REMARKS ON PHLYCTENULAR CONJUNCTIVITIS.

By E. Donaldson, Londonderry.

Climate and weather influence the course of phlyctenular conjunctivitis, or, as I think it may be correctly termed, eczema of the conjunctiva. This subject may be approached from different standpoints. We may investigate the histories of patients suffering from this affection, we may inquire whether the disease is more prevalent in winter or in summer, and we may learn its geographical distribution. Further, we may see if its relationship with eczema throws any light on the subject.

In estimating the values of histories allowance must be made for the tendency, often groundless, of many persons to attribute ailments to catching cold. We cannot, however, ignore striking histories like the following:

P. C., aged 7, was seen on June 26, 1897. Left eye had been affected for past six months, sometimes better and sometimes worse. His mother said: "If he goes to school in his bare feet, his eye is sure to be made worse." There was considerable photophobia, and a small phlyctenula was found near the centre of the cornea of left eye. The external nares were eczematous. The boy was well developed, and, except for his eye, in apparently good health. In another case the history was clear that the disease had been aggravated by a long cold drive on an outside car. Many years ago William Mackenzie pointed out the effects of climate on this disease. He says: "Our variable climate is a powerful promoter of scrofulous ophthalmia, while in the South of Europe, in the inland parts of Italy for instance, this disease is rare, even among the poorest of the people, whose food is the least digestible and least nourishing. We see the effects of climate on this disease in the rapid changes which it undergoes when the weather becomes either suddenly cold and wet, or dry and warm. All the symptoms are greatly aggravated by the former, and as remarkably relieved by the latter. New attacks, both in those who have and those who have not previously suffered from this disease, are most prevalent during north-easterly winds" (Third Edition, p. 419).

I have sometimes asked in prolonged cases whether relapses are more liable to occur in winter or in summer, and the answer is almost always in winter. No doubt some of the worst cases come under observation in the middle of summer, but we cannot for this reason in our variable climate exclude altogether the influence of cold and wet.

If we hold with Horner and others the very close relationship of phlyctenulæ with eczema, we can get further evidence of the influence of cold. We have seen that weather influences phlyctenulæ, and we learn from dermatologists that cold has a strong influence on eczema (see Crocker, "Diseases of Skin," p. 105).

A good many modern authors omit climate altogether when considering the ætiology of phlyctenular conjunctivitis, but Mr. Nettleship gives it due prominence. He says (Sixth Edition, p. 104): "Cases are much influenced by climate and weather." No doubt other factors are of more importance, such as the general health of the sufferers, and in treatment we order outdoor exercise notwithstanding the exposure to cold often involved. The evil effects of cold and wet should be recognised, and as far as possible avoided by suitable clothing and other precautions. In this way relapses may sometimes be prevented, and the treatment may be made more efficacious.

Spasmodic closure of the eyelids, intolerance of light, and excessive flow of tears always occur together, and are usually well marked when the cornea is the seat of this affection. The closure of the eyelids is a reflex act. The irritation produced by the round cells which go to make up the phlyctenulæ acting on the fifth nerve in the cornea, is conveyed to the nerve centre and thence to the seventh nerve. Light acting on the optic nerve also produces reflexly closure of the eyelids. Intolerance of light is very difficult to explain. Patients suffering from this disease adopt every device for keeping out the smallest quantity of light. Anyone can prove for himself by experiment that a little light passes through the gently closed eyelids, less still through the tightly closed eyelids, and none when the eyes are closed tightly and covered with the hands. The least light causes pain and is avoided as much as possible. The optic nerve is not as a rule very sensitive to pain. How, then, do we explain that light in these cases is intolerable? One view is that the irritation of the fifth nerve by the morbid process in the cornea so acts on the visual centres as to make them abnormally sensitive. This view takes for granted that there is a close connection between the centres of the fifth and the optic nerves. Another theory is that the stimulus produced by light falling on the retina is transferred to the fifth nerve in the cornea, and, this being in a very sensitive state by reason of the morbid process, causes pain. This view derives some support from a not uncommon clinical experience. When the eyelids of a patient with phlyctenular conjunctivitis are forcibly opened and light admitted to the eye, sneezing sometimes results.

The stimulus produced by light is radiated to the nose, where a tickling sensation is felt which produces reflexly sneezing.

The intolerance of light is maintained by the spasmodic closure of the eyelids. We know that if a person in perfect health passes from a place which is dark into another which is brightly illuminated, he will get a slight attack of photophobia. In the same way if these patients become accustomed to darkness, they will find much difficulty in bearing the light. Malnutrition keeps the nerve centres in an irritable state and prolongs the photophobia. That most of these patients are "out of condition" is shown among other things by the state of the hair, which when rolled between the fingers is found to be dry and harsh.

The lachrymation is brought about reflexly, the optic and the fifth being the afferent nerves.

It is remarkable that the three symptoms we are discussing improve during the afternoon. A child, who in the morning keeps his eyes tightly shut with the knuckles clenched against them, will later in the day open the eyes and play about. If the nerve centres are more stable in the latter than in the earlier part of the day, we could in this way account for the improvement. That these centres vary in their sensitiveness is shown by the good effects produced by cold douches.

REVIEWS.

HEAD (London) and **CAMPBELL** (Rainhill). The Pathology of Herpes Zoster, and its Bearing on Sensory Localisation. *Brain, No.* 91. *Autumn,* 1900.

This elaborate paper by Head and Campbell is one of unusual interest, and deserving of careful study by those engaged in clinical work as well as by pathologists. Apart from its more general bearings, the paper has a special interest for ophthalmologists, inasmuch as it deals with herpes of the trigeminal nerve area. Such cases not infrequently come under the observation and care of ophthalmic surgeons. It seems desirable, therefore, to publish in this journal an abstract of such parts of Head and Campbell's paper as deal more especially with herpes ophthalmicus. Those interested in the wider aspects of the subject will find the original article well worth perusal.

The authors have been fortunate in obtaining a remarkable number of cases for *post-mortem* examination. Although a large mass of literature on the subject of Herpes Zoster has accumulated during recent years, *post-mortem* records have hitherto been very few. Up to the time at which Head and Campbell began their investigations there had been two well-reported autopsies on cases of zoster ophthalmicus, and five satisfactory reports on zoster of the trunk. The authors now publish careful reports of the *post-mortem* examination in twenty-one cases of herpes at all stages after the appearance of the eruption.

In Part I., on the Pathology of herpes zoster, the authors describe the lesions (1) in the posterior root ganglia, (2) in the posterior nerve roots, (3) in the peripheral nerves, (4) in the spinal cord; and then devote a chapter to herpes zoster within the territory supplied by the trigeminal nerve (herpes ophthalmicus). The first satisfactory report on the *post-mortem* appearances in zoster was given by Sattler, on a case of so-called herpes ophthalmicus. He found an inflammatory lesion with hæmorrhage destroying both the nerve cells and fibres of the Gasserian ganglion. Head and Campbell confirm Sattler's statements from the examination of two cases of zoster within the territory of the trigeminal nerve. One case (No. 19 in the paper) was a typical supraorbital zoster covering the whole of the first, or ophthalmic, division of the trigeminal nerve, excepting only that the eruption did not extend to the side of the nose. Death occurred one hundred and ninety days afterwards, and the Gasserian ganglion showed what appeared to be the remains of an old hæmorrhage, with some destruction of nerve cells in that portion corresponding to the nerve division. The root bundles of the affected ganglion showed an appearance that made it probable that a few of them were sclerosed, but there was no acute degeneration in any part of the central nervous system referable to the lesion in the Gasserian ganglion. There was no noteworthy alteration in the ophthalmic division of the nerve peripheral to the ganglion.

In the second case (No. 18) death occurred thirty days after the outbreak of the eruption. In this case the herpes involved the area of distribution of the third division of the trigeminal nerve. Pathological changes were found in the Gasserian ganglion, in the roots of the fifth nerve, in the branches of the fifth nerve peripheral to the ganglion, and in the pons and medulla.

A comprehension of the position of the ganglionic lesion in this case will be facilitated by considering the Gasserian ganglion as a triangle, from the inner angle of which the greater part of the central root fibres come off. On the pre-axial angle of this triangle, the first or ophthalmic division, and at the post-axial angle, the third or maxillary division enters the ganglion. The focus of destruction is seen (in Author's Plate 9) running almost parallel with the post-axial side of the triangle directly dorsal of the position of the motor root, that is to say, it occupied that portion of the ganglion which stands in direct relation with the maxillary branch. This focus is roughly oval in transverse section. It appears to be made up of a large central nucleus containing brown material, obviously the broken-down remains of a hæmorrhage and the *débris* of destroyed nerve cells. This is surrounded by an area abundantly occupied by small brown cells, which envelope this area and extend up to the pia on the free surface; and for some distance into the ganglionic substance is a wider zone densely infiltrated with small round cells, in which remains only of nerve cells and nerve fibres can be seen. The remainder of the ganglion is healthy.

These appearances are an exact reproduction of the familiar lesion in the posterior root ganglion in herpes of the trunk, and just as the sheath of the spinal ganglion tends to become implicated in the lesion, so over this focus in the Gasserian ganglion the pia shows signs of thickening and infiltration.

Secondary to this lesion there is some degeneration in the root of the fifth nerve. It is principally confined to three fasciculi lying at the periphery of the transverse section opposite to the motor root. Although the lesion is only thirty days old, much of the black material of the broken-down medullary sheaths is already cleared away, and sclerotic changes are well advanced; but in the pons and medulla the degenerated fibres still stain by Marchi's method, just as if they were freshly degenerated. Thus here again the intra-medullary and extra-medullary portions of the central projection of a neuron behave exactly as in the spinal cord, and the products of degeneration are removed much more rapidly from the roots than from the central nervous system.

In the pons the so-called "descending" or cerebral root is completely free from degeneration, thus confirming the usually accepted view that this is the central portion of the motor root.

The so-called "ascending" or spinal root shows acute degenerative changes. At the point of entry into the pons a few scattered degenerated fibres are seen in all the bundles of the root, but in the outer portion two or three fasciculi are gravely affected. These fibres can be followed into the pons, and appear, when close up to the nucleus, to curve abruptly downwards external and ventral to the nucleus (shown in plate 13). More caudalwards, as soon as the sensory bundle has formed into the pear-shaped area, the degenerated fibres are seen to lie almost entirely in the upper two-thirds of this pear-shaped tract. The lower one-third is practically free from degeneration.

No fibres cross to the opposite side. At the level of the VIIth. nucleus the fibres are cut transversely instead of somewhat obliquely, and they lie almost entirely in the upper two-thirds of the pear-shaped field.

Opposite the great olive the degenerated fibres are less numerous, but are still situated in the upper two-thirds of the field.

Opposite the main decussation of the fillet the root lies between the dorsal half of the substantia gelatinosa Rolandi and the surface. Here the degenerated fibres again lie in the dorsal portion of the field, and the ventral portion is free from degeneration.

Opposite the first cervical root the degeneration is indistinct, but in the most dorsal portion of the substantia gelatinosa an obvious collection of black dots is seen, which is not present on the opposite side.

Thus it appears certain that in man the third division of the trigeminal is connected with cells in the Gasserian ganglion, which send fibres centralwards to lie in the so-called "ascending" or spinal root. They occupy the dorsal two-thirds of this bundle almost exclusively.

The second division of the trigeminal is closely allied to the third division in nature and function, in that both supply structures from the arches that enclose the first gill slit. It is therefore probable that the remaining undegenerated fibres of the spinal root of the trigeminal belong to the second division.

On the other hand, the first, or ophthalmic, division stands apart from the other two in its curious participation in visceral pain referred from organs in the thorax and abdomen. Thus it is possible that the central projection of the cells which give rise to this division may end around the upper sensory nucleus of the trigeminal nerve, for in the case just described the fibres which pass to and around this nucleus do not show any obvious signs of degeneration.

To sum up, the authors state that zoster of the branches of the trigeminal is associated with a lesion in the Gasserian ganglion similar to that found in the posterior root ganglion in cases of zoster of the trunk and limbs. This lesion causes secondary degeneration in the sensory root of the Gasserian ganglion, both in its extra- and intramedullary course.

In Chapter VIII. the authors describe the changes found in the skin and lymphatic glands. Sections through a vesicle of herpes zoster show a cavity, the floor of which is formed of naked papillæ in a condition of profound inflammation and infiltration, with masses of small round cells. This infiltration extends down to the terminations of the sweat glands and hair follicles. The vesicle is split into incomplete cavities by septa, evidently the remains of epithelial layers. The cavity of the vesicle is filled with a fluid which coagulates under the influence of the hardening agent into a somewhat granular hyaline mass. The contents of vesicles examined during life proved sterile in every instance (five cases), and careful staining of sections of skin failed to reveal any micro-organisms.

The lymphatic glands frequently become enlarged and tender early in the disease, and examination of enlarged glands removed under rigid aseptic precautions two hours after death showed that although they were acutely inflamed, they were free from micro-organisms.

In Chapter IX. the authors give their reasons for considering herpes zoster as an acute specific disease of the nervous system. They say herpes has a prodromal period of varying length, during which the temperature is raised, the patient feels ill, but has no diagnostic signs. If a child, he is supposed to be sickening for one of the ordinary acute specific diseases. The nature of the case is declared by the sudden appearance of the rash, usually on the third or fourth day of the disease. The febrile period lasts from three to five days, and this may be considered the duration of the acute disease.

If zoster be an acute specific disease, second attacks should be uncommon, and as a fact it is found that second attacks are less common than second attacks of measles. Only four such instances have been met with in over 400 cases. Also, the disease should tend to occur more at certain periods than at others, or should even appear in actual epidemic form. This is now recognised to be the case. The records at the London Hospital tend to bear out this statement, for although sporadic cases occur throughout the year, there is a large increase in the number of cases at certain seasons. In 1896, 1897 and 1898, there was an epidemic in the middle of March. In 1897 and 1898 there was an outbreak from the middle to the end of May. In 1897 a large number of cases appeared from the end of July to the beginning of November. During this period of four months, fifty-eight cases were seen, or one-half the total number for that year. In 1898 several cases appeared together in June, and there was a marked outbreak from the middle of July to the end of August, during which period twenty-two cases were seen in less than six weeks. Thus there can be little doubt that the occurrence of epidemics of herpes zoster is associated with some atmospheric influence or conjunction of which we are yet ignorant.

The close clinical and pathological analogy between herpes zoster and acute anterior poliomyelitis is referred to, and the points of resemblance given by the authors.

The nature of the changes which produce herpes zoster.— After some discussion of this question, the authors proceed as follows: The universal characteristic of the changes described in the affected ganglia is the presence of inflammation in every degree, from scattered collections of small round cells to profound hæmorrhages in the centre of inflammatory foci. A certain number of ganglion cells seem to be killed outright, and others so injured that they quickly die. The remainder, however they may have been changed at the onset of the disease, rapidly recover. Very few, if any, of the ganglion cells appear to be undergoing that steady process of disintegration which we have learned to associate with the appearances known as chromatolysis. It would therefore appear that the changes in the posterior root ganglion or the Gasserian ganglion, consist of an acute interstitial inflammation accompanied by necrosis of the ganglion cells. Of the nature of the agent which is responsible for this process, we are completely ignorant. Microscopically, no signs of bacterial infection have been found, but no cultivations have been made by the authors, for fear of spoiling their material for other purposes.

This agent, whatever it may be, seems to have a specific attraction for the posterior root ganglion, exactly as the equally unknown cause of acute anterior poliomyelitis has for the substance of the anterior horns. Moreover, it is particularly liable to attack the dorsal part of the ganglion, that is, the portion opposite to the anterior root.

This unknown agent not only shows a specific attraction for the posterior root ganglion, but commonly attacks one ganglion only, and some ganglia seem to be more prone than others to its action, as is shown by a table compiled by the authors from the records of 392 cases. The ganglia more susceptible to the action of this toxic agent are those which contain a preponderance of the smaller type of ganglion cells. These small cells, amongst other functions, subserve that of pain, hence the intense pain which accompanies attacks of herpes zoster.

The paper is illustrated by a number of beautiful plates, and by numerous diagrams; it forms a noteworthy and most valuable contribution to our knowledge of the pathology of herpes zoster.

J. B. L.

A. BOURGEOIS (Rheims). Simple Extraction of Senile Cataract by External Lateral Section, with Suture of the Cornea. *Annales d'Oculistique, January*, 1901.

In this paper Bourgeois, while satisfied with the everyday simple extraction in normal cases, describes a procedure which he thinks may prove useful where the ordinary operation presents unusual difficulties. In patients, for example, of defective intellect, or who lack self-control; for those with very narrow palpebral aperture or who are totally deaf; for eyes unduly prominent, or cases of degenerating cataract in which the zonula is likely to give way, and in cases of dislocated lens, he considers that a lateral section with sutures gives greater control and reduces the risks to a minimum.

The most original part of the *technique* described is the manner of making the section. He uses two "broad needles" with perfect cutting edges, the handles of which are securely locked together by a simple mechanism (which admits of their being easily separated) so that the blades lie in exactly the same plane with an interval of one millimetre between them. This "double keratome," as one may call it, is inserted, as if for ordinary paracentesis, at the middle of the outer margin of the cornea. The fixation forceps, holding the eye on its inner side, is at once handed to an assistant. The surgeon unlocks the two halves of the double keratome, and, while holding the lower one *in situ* with his left hand, completes the upper half of the section with the upper blade, cutting along the corneal margin almost up to the vertical meridian. The lower half-section is completed in like manner with the other blade. A small bridge of cornea remains, corresponding to the interval between the two blades. Before dividing this two sutures are inserted. These are of the finest strong black silk, and are sterilised by soaking for an hour in chloroform along with the needles. From this they are removed in time to allow all the chloroform to evaporate before they are used. The first needle is passed through the cornea from without inwards at the centre of the lower half-section and half a millimetre from the corneal edge. It is drawn through with a fine forceps, and passed through the scleral lip of the wound from within outwards; the loop is left lying towards the lower eyelid. A like procedure is followed with the upper suture, leaving the loop lying towards the upper eyelid. The threads are prevented from touching the eyelids by pads of cyanide gauze. The narrow corneal bridge is now divided with a blunt pointed knife. The lens is then extracted in the usual way, or it may be scooped out in its capsule by means of a curette. The sutures are then tied, traction being made on the scleral, not on the corneal side. They are removed on the fifth or sixth day.

The author has performed this operation in only four cases, in all of which the ordinary operation appeared to him risky. All were successful. The sutures gave rise to no trouble, healing was rapid, and the visual results were satisfactory. One of the cases was a woman who was deaf, very nervous, and suffering from chronic bronchitis with frequent attacks of vomiting. There had been previous iritis, and "the lens had to be extracted by means of the curette." A drop of vitreous presented in the wound, but, on tightening the sutures the iris at once receded and all went well.

Bourgeois claims that his operation gives the maximum of security in cases with unusual difficulties, and that its one drawback is that it takes five minutes longer than an ordinary extraction.

The paper is suggestive. Cases recorded by Risley and others give ground for thinking that when a loss of vitreous is to be apprehended, corneal sutures, originally suggested, I believe, by Kalt, are valuable. If in the future they are more generally employed than hitherto, it will probably be with a lateral section as suggested by Bourgeois, which certainly offers new facilities in their use.

W. W. Sinclair.

C. HAMBURGER (Berlin). **On the Sources of the Aqueous Humour.** *Klinische Monatsblätter für Augenheilkunde, December*, 1900.

At the outset the author declares himself a seceder from the view of Leber and his school, viz., that the aqueous is entirely a secretion from the ciliary body, the fluid passing freely forwards from the anterior chamber through the pupil. He maintains on the contrary that in normal conditions there is little or no passage of fluid forward through the pupil, and that the fluid which fills the anterior chamber comes really from the blood vessels of the iris. Experiments for and against his own theory are quoted and the evidence passed carefully under review.

A very striking experiment cited is the injection of very small quantities of fluorescin into the posterior chamber in albino rabbits. The fluorescin, which was readily visible through the iris, did not come through the pupil for fifteen or twenty minutes. When it began to appear, it came, not in a steady stream, but by successive little rushes, the iris closing the communication between the anterior and posterior chambers between the rushes like a valve. The ordinary reaction of the pupil to light and shadow did not allow any fluid to pass, but a 5 per cent. solution of cocaine caused the fluorescin to stream through the pupil. In iridectomised animals it was impossible to keep the fluorescin in the posterior chamber. This experiment, Dr. Hamburger thinks, is the strongest evidence in support of his theory and against that of Leber.

A second experiment, which seems on the other hand to support Leber's view, is cited. Following Leber, Hamburger exposed the anterior surface of the iris in a rabbit by excision of part of the cornea. The exposed surface of the iris appeared dry, while fluid oozed freely from the ciliary body; only in a few cases was Hamburger able to find evidence of secretion of fluid from the surface of the iris. This positive result was best seen after the animal had been injected with fluorescin. Reasoning on this experiment, Hamburger has to allow that at any rate after evacuation of the aqueous, the secretion from the ciliary body is enormously more copious than that from the iris; at the same time he argues, and we think with some reason, that in such an experiment the conditions are too abnormal to give reliable conclusions as to the passage of fluid from the vessels of the iris when it is bathed by the normal aqueous secretion. Further, he goes on to cite a counter experiment in which he removed part of the vitreous and simultaneously injected the animal with fluorescin. The intra-ocular tension was much reduced, and very soon drops coloured by fluorescin were seen to exude from the anterior surface of the iris, coalesce, and diffuse into the aqueous. In this experiment little or no ciliary secretion appeared to pass forwards, while on opening the eye the region of the ciliary body was found flooded with secretion tinted with fluorescin.

In further support of his views the author cites Wessely's observation that in the freshly enucleated normal eye of an injected animal, although the aqueous may have been coloured with fluorescin for even half-an-hour, still the ciliary region will show little evidence of the stain.

The next question which Hamburger discusses is whether this supposed secretion from the iris is sufficient to supply the aqueous under physiological conditions. This leads to the further question of the rate of regeneration of the aqueous under normal conditions. Niemanoff's conclusions are taken as probably very nearly correct; viz., that the fluid contents of the anterior chamber are renewed about once in half-an-hour. Hamburger now argues thus:—If the aqueous is renewed at a rate so rapid, and if the flow through the pupil is so slight, as was shown by the retention of fluorescin in the posterior chamber, whence comes the fluid for renewal of the aqueous unless it be from the iris?

Hamburger's views and conclusions are summed up as follows:—

(1) Fluid is constantly leaving the anterior chamber but is *not* constantly entering it from the posterior chamber through the pupil.

(2) The volume of aqueous remains constant, so to make good the loss from the anterior chamber, fresh fluid must come from anterior surface of iris.

(3) It is proved that after evacuation of the aqueous the fluid is restored by secretion from the ciliary body, but this fluid differs from normal aqueous in containing albumen and fibrin in quantity.

(4) Doubtless after puncture of the cornea the secretion from the ciliary body far exceeds that from the iris, but it must be borne in mind that under normal conditions the quantity of aqueous needed is small.

(5) Wessely's observations (as given) are strong evidence against the idea that the ciliary body is under normal conditions the chief source of the aqueous.

(6) The so-called "Ehrlich's fluorescin line" in the anterior chamber may be taken as evidence of secretion from the iris.

(7) Secretion from the iris has been directly observed after fluorescin injection and reduction of intra-ocular tension.

(8) Leber's objection that Hamburger's experiments only showed that secretion of the aqueous took place more slowly than was supposed, does not hold good. He maintains that there is no doubt at all of the water-tight apposition of the iris to the face of the lens, as proved by his experiments.

(9) This physiological closure of the pupil is broken by various conditions, *e.g.*, maximal dilatation of the pupil, and inflammations of the iris, ciliary body, &c.

(10) Normally the function of the ciliary body is to secrete fluid for the structures behind the iris, but the aqueous humour in physiological conditions is derived, for the most part at least, not from the ciliary body but from the anterior surface of the iris.

With regard to the work of Nuel and Asayama,[1] who consider that the iris plays an important part in the absorption of the aqueous, Hamburger maintains that the double functions of secretion and absorption are common to all serous surfaces and are in no wise contradictory.

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[1] See OPHTHALMIC REVIEW, 1901, p. 14.

J. V. Paterson.

FRENCH SOCIETY OF OPHTHALMOLOGY.

January, 1901.

Foreign Body long Retained in the Globe.—M. Vignes exhibited the eye of a man which he had recently enucleated, who had the following history. Some years ago he had received an injury while hunting, and on examination his cornea was found to be punctured, and a minute wound to be present in the lens ; visual acuity was normal, and there were no symptoms. Two years after this detachment of the retina was diagnosed, and an attempt to remove the foreign body, whose presence was suspected, was made without success. One year later the detachment had extended, and as irido-choroiditis was also present, the eye was enucleated. A fragment of copper was found fixed in the sclerotic. The remarkable fact was the continued transparency of the lens after such a wound. Radiographic examination of the patient, it was mentioned, had not given the slightest indication of the existence of a foreign body.

Optic Neuritis and Pigmentary Degeneration of the Retina following Typhoid Fever.—M. Antonelli related the case of a man of 38, who had been blind since his 14th year as the result of a severe attack of typhoid fever; there had been no true night-blindness, but blindness had been complete by the end of six months. Now the ophthalmoscopic appearances were those of post-neuritic atrophy ; there were also areas of old choroido-retinitis, with retinitis pigmentosa, the pigment masses of which were unusually large and very black. He quoted Braun's observation, that neuritis after typhoid fever was to be regarded not as an affection of the nerve by continuity with the meninges, but as a toxic lesion, due directly, like other vascular manifestations of similar date, to the toxins evolved.

M. Morax observed that this particular case did not afford much support to Antonelli's views on the pathology, for the occurrence of choroidal complications did not tally well with the idea of a toxin acting on the nerve specially.

M. Sulzer was of opinion that examination after removal of any eye affected with retinitis pigmentosa always showed that the choroid was affected, whether this could be made out previously with the ophthalmoscope or not.

M. Antonelli, in reply, had not meant to imply that the retinal changes were other than secondary.

Visual Acuity from a Medico-legal and Insurance Point of View.—M. Dehenne thought the Society should endeavour to decide upon a minimum of vision sufficient for each occupation, with the view of determining the amount of damage done by any accident or other occurrence, and the rightful compensation in any given case. This is done in the case of the railway services, he himself had for many years carried it out in the police force, and he considered that with a little trouble it might be done for all other occupations ; one effect would be to secure uniformity in the scale of reparation when evidence had to be given on the subject. His standard for the police was that the candidate must have $\frac{1}{4}$ with both eyes together, and a minimum of $\frac{1}{6}$ for either separately ; this of course without any correcting lenses, which, for obvious reasons, could not be permitted. He found that with this amount of sight a man was perfectly capable of performing all his duties. He disapproved of the present system (current in France) of expressing the amount of vision by means of such a fraction as $\frac{1}{2}$ or $\frac{1}{4}$, which is indeed a purely conventional arrangement of figures, since the public are apt to suppose that in the case of a man whose vision is $\frac{1}{4}$ only, he lacks $\frac{3}{4}$ of what he ought to possess—a most erroneous idea.

M. Sulzer observed that in a great number of occupations the vision might be lowered to even less than one-half of the normal without serious interference with working power, for example in agricultural labourers, while in other occupations a vastly less reduction totally incapacitates. Therefore no calculation based on the mere degree of reduction of vision can suffice as a basis of compensation, and must be replaced by the relation between the amount of reduction and the physiological minimum for a given occupation, or what he calls the professional visual acuity. He thought that the result of careful investigations made in Germany had been rather to demonstrate the impossibility of establishing any hard and fast calculation which would show the degree of professional inefficiency from the physiological inefficiency. A good deal must depend, too, upon the personal adaptability of the individual—a consideration which no tables can take into account. The extreme complications of modern life practically limit one to generalisations in regard to the professional acuity, and Maschke has suggested that the simplest plan is to divide all occupations into two classes, viz., those requiring a high, and those requiring only a lower or ordinary degree of vision, and one had, of course, to decide to which of these classes the claimant may belong. The superior limit of professional visual acuity must for any given occupation be the lowest physiological acuity which will enable a person to carry it on, as has been rightly stated already by Groenouw and others; for any superior vision to that did not augment the capacity of the worker, and if he had previously to his accident a higher degree, diminution of this will not affect his working value, provided this diminution is not carried below the upper limit of professional acuity. In certain occupations (*e.g.*, railway service) this limit is fixed by law, it being the minimum degree of vision permitted to an entrant. For any other profession or trade the matter is by no means so simple; one has to ascertain by observation alone what amount of sight is required before a person can work at it unhampered. The inferior limit of professional acuity is that point below which the occupation is impossible in any degree.

He agreed in the main with the table devised by Groenouw, in which so long as the visual physiological acuity remained above one-half, professional acuity remained entire for the majority of occupations. (This was not true of course of the first class of trades, namely, such as required a superior order of vision; for example, watchmaking.) When physiological acuity sank to ·4, ·3, ·2, or ·15, professional acuity was exactly double of that figure, namely, ·8, ·6, ·4 and ·3 respectively. Below this limit the ordinary means of livelihood were impossible. Calling the superior and inferior limits of professional vision for any given occupation, s and i respectively, one can find the professional acuity (Vp) very simply by means of the formula $Vp = \frac{v-i}{s-i}$.

The loss of one eye completely, the other being intact, might be considered to involve a loss of $\frac{1}{5}$ to $\frac{1}{3}$ of the visual power in virtue of the loss of the field of vision; the higher scale would naturally be applicable in such occupations as necessitate binocular vision, for example, photography. In the German jurisprudence, on which this is founded, allowance is included for disfiguration as well as a loss of wage-earning power, but since this is not so in France, he suggested that the degree of loss should be considered as $\frac{1}{4}$. In regard to compensation for loss of binocular vision, the German scale was again quoted with approval, and the tariff-table exhibited. This shows the degree of loss of physiological visual efficiency caused by any degree of damage to one eye combined with any degree of damage to the other. One peculiar point about the table was that in the case of complete or nearly complete loss of both eyes, the appropriate compensation was shown as more than 100 per cent. of former wage-rate, amounting as a maximum to 125 per cent. The reason for this, which at first sight appears somewhat strange, was that a man who had completely lost all sight was not merely unable to work for himself, but was unable to live by himself. But with all this elaboration, even allowing a margin for the varying degrees of sight required according to the nature of the claimant's particular occupation, allowing also for the special value of binocular vision in that occupation, there yet remained the personal matter, the individual variation which no table can reach. He thought, however, that the difficulties in any given case would be greatly lightened if a committee of the Society were to make an effort to ascertain and define the professional visual acuity for a number of different occupations.

Dry Heat Apparatus for Application to the Eye.—M. Pechin exhibited an apparatus consisting of an indiarubber bag containing a small quantity of acetate of soda ; this when plunged into boiling water and removed again, continues, in virtue of developing latent heat of fusion, to give out a considerable degree of heat for a number of hours. It had been found very serviceable for the application of dry heat to the eye and lids.

W. G. S.

AMERICAN MEDICAL ASSOCIATION—SECTION OF OPHTHALMOLOGY.

[*Notes of certain papers read at the Annual Meeting held at Atlantic City*, *New Jersey*, 1900.]

PART II.

H. V. WURDEMANN (Milwaukee), Chairman.

(*Continued from p.* 90.)

Value of Homatropine as a Cycloplegic.—E. C. Ellett (Memphis) formerly employed homatropine in solution, but as this was found to irritate and cause conjunctival and ciliary congestion, a drop of cocaine was instilled. He now uses gelatine discs, each containing gr. $\frac{1}{50}$, preceded by a drop of cocaine. After the disc is inserted a handkerchief is applied to the eye. A second and third discs are placed in the eye at intervals of half an hour: the resulting irritation may be relieved by cocaine. The advantage of the disc is that the gelatine yields the drug slowly as it is absorbed. Of fifty-two cases subsequently examined under atropine, thirty-six showed an average increase of hyperopia amounting to 0·54 D.; in the entire series the gain was 0·34 D. Changes in the axis of the cylinder were occasionally noted. On the whole, the homatropine yielded satisfactory results. Where spasm of the ciliary muscle and choroido-retinal irritation are present, atropine is to be employed for its therapeutic, as well as for its cycloplegic properties.

C. M. Culver (Albany) had found from comparison tests made between atropine and homatropine, that the latter is satisfactory for ophthalmometric purposes. He prefers the solution to the discs.

Casey A. Wood (Chicago) emphasised the necessity of keeping the eye closed after the disc is inserted, otherwise the corneal epithelium may suffer; if, however, any special reason is present to demand it, he insists upon atropine. It must be remembered that a second examination made a short time after the first, with any cycloplegic, will bring out more H. and As. than was shown at the first. At least a month should elapse between two comparative tests.

F. C. Hotz thought homatropine reliable in the majority of cases, provided the eye was healthy. He had made no special comparison tests, but when patients returned for a second examination he had often used atropine, and the difference, if any, was found to be slight. He used first one drop of a 2 per cent. solution of cocaine, five minutes later a drop of homatropine solution of the same strength, and fifteen minutes later another drop. The eye was kept closed three to five minutes after each instillation. As a rule two instillations of homatropine only were employed. At the expiration of forty minutes the eye was ready for examination.

J. L. Thompson (Indianapolis) said his experience with homatropine was that a majority of cases measured later with atropine and scopolamine, showed that homatropine did not bring out the whole error. In some subjects, however, a single drop of the homatropine was sufficient to paralyse the accommodation completely.

Wm. Thomson (Philadelphia) asked what means the speakers adopted to determine whether the accommodation was completely suspended. He himself determined this by producing an artificial near point with a convex lens of 3 or 4D.

S. D. Risley (Philadelphia) insisted upon the importance of using the mydriatic for the therapeutic, as well as the cycloplegic action, since in most of the cases of asthenopia the eyes are not healthy. If homatropine were employed, it should be used for several days until the subsidence of the chorio-retinal irritation, but he himself prefers hyoscyamine, because it holds the accommodation more firmly than homatropine.

Injury to Earning Capacity from Loss of Vision.—H. F. Hansell (Philadelphia) pointed out that the earning capacity of the individual is the effective result of the complex combination of physical and mental qualities, special senses, education, training, and experience, and cannot be reckoned from the standpoint of the function of any one isolated organ or sense. Hence no dogmatic statement can be formulated which would be applicable to more than a small class, or include more than one trade or profession. The estimates of Accident Insurance Companies are arbitrarily fixed, and depend upon the proportion of eye injuries to injuries of other portions of the body, on their relation to the whole number of the insured, and upon the amount of premium the insured is willing to pay. The United States Bureau of Pensions has fixed the rates for disability arising from diseases of the eye thus : total blindness of both eyes, 72 dollars per month ; loss of one eye, 17 dollars ; loss of sight of one eye 12 dollars.

Blindness is defined practically as the loss of the ability to count fingers at the distance of $\frac{1}{3}$ metre ; and in respect to earning capacity it is the loss of vision necessary to gain a livelihood at any occupation whatever. The acuity of vision as expressed by Snellen's test types is not a safe criterion of the practical value of sight when applied to the earning power of individuals in most kinds of labour, for the railway engine driver must have full acuity, while the student may have only $\frac{20}{100}$ and yet earn as much as though he had $\frac{20}{20}$.

The degree of loss to the earning power in complete *monocular* blindness has been exaggerated. and is sentimental rather than real. Zehender is correct in saying that in all trades except a few, men with one eye are as capable as those with two ; and the one-eyed man's one eye is worth both eyes of the two-eyed. The possession of two eyes is sometimes a disadvantage, since it is prohibitive of certain occupations, in cases of muscular errors.(!). Imperfect vision in one eye may, until the individual learns to disregard the blurred retinal image, interfere with the use of the other. The one-eyed man is inferior to the two-eyed in respect to limitation of the field of vision, danger of total blindness from loss of the remaining eye, and in the choice of an occupation.

The requirements of vision depend upon the nature of the occupation, and the amount of reimbursement should depend upon the loss of visual power and upon the wages earned during full competency. If we accept the view that the loss of one-half vision will not affect the earning power, the gradations of the loss of earning power in further declines of vision may be thus tabulated :—

Vision.	Loss of Earning Power.
$\frac{20}{60}$ ...	$\frac{1}{5}$ or 20 %
$\frac{20}{80}$ ...	$\frac{1}{3}$ or 33 %
$\frac{20}{100}$ ...	$\frac{1}{2}$ or 50 %
$\frac{20}{150}$ ...	$\frac{2}{3}$ or 66 %
$\frac{20}{200}$ ...	$\frac{4}{5}$ or 80 %
$\frac{5}{200}$ ...	$\frac{19}{20}$ or 95 %
Counting fingers at $\frac{1}{3}$ M. ...	$\frac{5}{5}$ or 100 %

He concluded that "blindness" is that degree of loss of vision which incapacitates one from earning his living in any occupation requiring the use of the sense of sight, the degree varying according to the demands of the occupation. The loss of more than one-half of vision diminishes the earning power, and the lower the vision the greater the loss of earning power. Monocular blindness is not incompatible with full earning capacity. Monocular blindness *plus* weak sight in the remaining eye rapidly lowers the earning capacity. The loss of earning power from defective vision may be computed according to a simple method based upon the ratio of the loss of vision to the full earning power, at any age, and in most occupations.

Cataract Extraction.—F. T. Rogers (Providence) reported the failures in a series of one hundred operations, with an attempt to determine the causes. Iridectomy was performed as a rule, and about equally good vision was secured in the combined and the simple extractions. Five eyes were lost, and in four additional cases light-perception only was obtained. Greater attention, he thought, should be paid to the general condition of the patient. Artificial light was to be preferred to daylight. The exact size of the corneal section was not of great importance. Combined extraction was to be preferred by the beginner. The occurrence of iritis does not usually entail a bad result.

E. E. Holt's (Portland) experience was based on about one thousand operations. He liked to have the patient under observation for a week, looking after the diet, bowels, bathing, &c., during which time the conjunctival sac was washed with a 1-5000 bichloride solution daily. He syringed the lachrymal sac, examined the nasal cavities, and removed all possible sources of infection ; he examined the lens under weak mydriatics to determine its size, which is at times difficult to do. He formerly did the combined extraction, but for the past ten years he had done the simple operation as a rule; he usually made a small conjunctival flap, prolapse of the iris being thus less likely to occur; when changing from the combined to the simple operation he had to learn a new *technique*. His dressing consists of absorbent cotton held in place by isinglass plaster.

R. L. Randolph (Baltimore) thought it unnecessary to use mercuric chloride solution before operation. He used no douches at all now, and employed holocain rather than cocaine.

J. L. Thompson (Indianapolis) thought great pains should be taken in making the toilet of the wound. He had never lost a case in which he had done preliminary iridectomy.

Visual Defects in Railroad Service.—Frank Allport (Chicago) insisted upon uniform requirements for railroad service. He was of opinion that a scientific examination of the eyes and ears of all who have anything to do with the running of trains should be made upon entrance into the service by a specialist or by the Company's surgeon; all doubtful cases should be sent to the specialist. These examinations should never be made by laymen. Employées should be divided into two classes: first, those actually engaged in running the trains; second, accessory employées, such as telegraph operators, &c. The first class ought to have full vision, perfect colour sense, and if hyperopic at all, certainly not over 2 D.; a lower standard might be permitted in the second class. All men should be examined every three years, and after any severe illness or other circumstance liable to impair sight or hearing.

A. E. Bulson (Fort Wayne) thought that glasses should not be permitted to be worn by train men. He believed that non-medical men trained by an oculist can manage the major portion of the tests sufficiently well.

Secondary Cataract Operations.—P. A. Callan (New York) considered the two sources of danger to be the introduction of septic material and traumatism of the ciliary processes; the operation should not be done until the eye had become entirely quiet after extraction. The essential principle was to cut, not to tear, the membrane. For thin membranes he used a knife-needle and made a T-shaped incision. For thick tough membranes he preferred the forceps-scissors, first making an opening in the membrane with the point of the long narrow keratome used in making the corneal incision.

W. H. Bates (New York) maintained that filling the anterior chamber with salt solution prevented the formation of secondary cataract.

J. E. Weeks (New York) did a secondary operation in 99 per cent. of his private, and 70 per cent. of his hospital cases. Solutions of salt and boric acid did not, to any marked extent, prevent the formation of secondary cataract.

A. W. Calhoun (Atlanta) had gone back to combined extraction, as he thought secondary cataract less likely to form after it than after the simple operation. He did his secondary operations with a Graefe knife.

H. Knapp considered that simple extraction was the best and safest operation. Iritis with adhesions was the cause of secondary cataract, and this might often be avoided by opening the capsule at its upper periphery. In capsulotomy for secondary cataract, there should be a clean cut and no tearing; for a thin membrane the knife-needle was sufficient, but a portion of a thick one should be removed with scissors. Where the secondary cataract included cicatricial tissue, no method was absolutely certain, as the openings tended to close again and again.

Cleansing of Nasal Cavities before Operations involving Opening of the Eyeball.—J. A. Lippincott (Pittsburg) thought the ordinary precautions against sepsis, viz., those relating to cleansing the conjunctival sac and instruments, were not sufficient. The nose was the principal source of infection and should be thoroughly sprayed with a solution of permanganate of potassium, 1 to 2,000, before operation. This procedure tended to prevent not only corneal infection, but also less serious forms of inflammation, such as iritis, and thus favoured speedy healing and a good result.

G. E. de Schweinitz (Philadelphia) stated the spraying had seemed to reduce the hyperæmia following operations. He had noticed only one evil result, namely, excessive sneezing.

Coloboma of the Lens.—James M. Bell (St. Louis) reported a case of binocular coloboma of the crystalline lens, with drawings showing the appearances presented. There was no coloboma of the iris or choroid.

Tubercular Tumour of the Orbit.—H. F. Hansell (Philadelphia) had been unable to find a single case of tubercular tumour of the orbit on record, notwithstanding that this situation is a favourite locality for neoplasms. He reported one in a girl of 13, who presented a movable and painless tumour, loosely attached to the roof of the orbit. Microscopic examination proved it to be primarily of tuberculous origin, with some leucocytic infiltration.

Identification of Body by Ossification of the Choroid.—R. L. Randolph (Baltimore) reported the case of a body that had been at the bottom of the Niagara River for nine months. When discovered it was in so advanced a state of decomposition that the Insurance Companies denied the possibility of identification. However, the friends remembered that the man had been blind of one eye since early childhood, from an injury. On examination of the body one eye showed ossification of the choroid, which demonstrated it must be that of a man who had been blind in that eye for many years.

Local Therapeutics to promote Absorption of Exudates within the Eyeball.—Uribe Troncoso (Mexico) found direct infection the most frequent cause of exudation within the eyeball, and therefore advocated immediate and rigorous antiseptic treatment. He spoke well of subconjunctival injection of cyanide of mercury. To promote the absorption of corneal exudates after the irritative phenomena had disappeared, he recommended hot compresses, the vapour of hot water projected on the cornea, and the use of yellow oxide ointment. He had found the subconjunctival injections of cyanide of mercury very successful in these cases also. In plastic iritis the absorption of exudates was promoted by the application of heat, blisters and leeches. Atropin was of great value, not only by decreasing the inflammation, but by promoting absorption.

Massage of the Eyeball.—Casey A. Wood (Chicago) considered indirect massage with the pulp of the finger placed on the skin of the lids preferable to any instrumental method. Massage should not produce pain ; and the *séance* should rarely exceed four minutes once a day. He usually instilled a drop or two of cod liver oil or castor oil, in which remedial agents might be dissolved if desired. Massage was recommended for chronic conjunctivitis, for most forms of ulcer of, and deposit in, the cornea, and for the temporary relief of glaucoma.

Immature Cataract.—G. E. de Schweinitz (Philadelphia) remarked that lenticular opacities, especially those situated in the naso-inferior quadrant, were often practically stationary, and must be distinguished from those to which the name incipient cataract is ordinarily given. Some depended upon disturbance of the choroid, apart from active choroiditis, and their progress was sometimes checked by measures which restore the choroid to the normal condition, though those which had already formed, remain. Certain lenticular opacities appearing in association with diabetes, nephritis, lithæmia, and arterio-sclerosis were apparently retarded by treatment of the general condition. Some opacities produced astigmatism, the correction of which might result temporarily in a surprising improvement in vision, some caused an obscuration which could be relieved by moderately tinted glasses and mild mydriasis. Extraction of unripe cataracts was preferable to any of the ordinary operations for ripening; there was little or no evidence that electricity, massage or drugs had the slightest influence in checking or in dissipating cataracts.

A Clinical Study of Hyperphoria.—Wendell Reber (Philadelphia) found that hyperphoria occurs in about one out of sixteen patients, and becomes worthy of special attention in about one out of five refraction cases.

Exhibition of Instruments.—Dr. W. B. Johnson (Patterson) exhibited a portable Magnet much more powerful than the Hirschberg magnet or any other of that class. It seemed as useful as the Haab magnet, while much less expensive.

Dr. W. M. Sweet (Philadelphia) exhibited a new recording electric Perimeter.

C. F. Clark (Columbus) exhibited a double Hook for advancement operations. Through the fenestrated foot of one hook passes a second smaller one, which, by the action of a screw, draws up a fold of the tendon through the opening, and holds it in position while the sutures are being inserted.

W. F. Southard exhibited an Ophthalmometer with porcelain mires for transillumination by electric light.

Dr. Jackson exhibited a Trial Frame marked with broad alternating black and white bands, for determining the principal meridians of astigmatism by the shadow test.

He also exhibited crossed Cylinders with a handle set at 45° from the axis, allowing instantaneous reversal from one meridian to the other.

COLLEGE OF PHYSICIANS, PHILADELPHIA—SECTION ON OPHTHALMOLOGY.

October 16, 1900.

Dr. George C. Harlan, in the Chair.

Removal of Metallic Foreign Bodies.—Dr. William Thomson exhibited two men from whom he recently removed small chips of metal by the small magnet, from the posterior portion of the eyeball. In one case a piece of iron, 8 mm. by 1·5 mm., penetrated the inner side of cornea near the horizontal meridian, and was located by the X-rays embedded at a point of 5 mm. below and

3 mm. to the temporal side of the macula. The body was removed through a scleral incision midway between external and inferior recti. Very little reaction followed. In the second case a chip of steel entered the cornea, near the outer side of the centre, wounding iris and lens, and embedding itself, as shown by the radiographs, 2 mm. above and 6 mm. to nasal side of macula. The partially transparent lens was extracted through the usual incision, an iridectomy performed, and the point of the magnet passed to the supposed situation of the metal. Upon its removal a piece of steel, 1·5 mm. by 1 mm., was found attached to the magnet point. Three weeks after operation the eyeball was markedly injected, with lessened tension.

Embolism of Central Retinal Artery.—Dr. George C. Harlan showed an Italian girl, aged 14, presenting the history and the ophthalmoscopic appearances of this condition, except that the arteries contained blood and pulsated freely on pressure. The patient had menstruated regularly for two years, and seemed to be in perfect health. Sight was suddenly lost in the right eye on October 7, and when she came to the Pennsylvania Hospital two days later, there was faint perception of light revealed by the flash of the mirror, which had since given place to absolute blindness. The whole fundus, except the extreme periphery, presented a grayish white colour, most dense about the macula and disc, and shading off gradually to nearly normal red at the periphery. The red spot at the macula was darker than the typical "cherry-red." The vessels were obscured in places by the retinal opacity, but reappeared. The arteries were normal in calibre and pulsated freely under pressure. The veins were slightly engorged. There were no hæmorrhages. On October 16 the arteries were somewhat narrowed, but still pulsated under moderate pressure, the veins less engorged and of lighter red, and the red spot at macula also lighter, while two bright red punctate hæmorrhages had appeared in the macular region. There was no marked change in the general colour of the fundus, but the disc was decidedly pale. Considering the full arteries and distended veins, the most probable diagnosis seemed at first to be venous thrombosis, but the subsequent narrowing of all the vessels and the absence of considerable extravasations did not encourage this view. Incomplete embolism was more probable, but the pathology was very uncertain. The urine and blood were normal. Hæmorrhage in the nerve sheath was also suggested as a possible cause.

Simple Extraction of Cataract.—Dr. Risley exhibited a man from the Wills Hospital, aged 59, upon whom he had operated in each eye. The case was presented because of the unusually favourable results which had been reached. Vision was $^{6}/_{v}$ in each eye, and the man enjoyed perfect binocular vision both for distance and in reading; the pupils were central and round, reacted normally to change of light and shade, and there were no adhesions in either eye, either to the capsule or the cornea in the region of the wound. The cicatrix in the line of the incision was visible only on careful inspection, and was then found to lie in the clear corneal limbus. Dr. Risley said that he had never before been able to secure in both eyes of the same patient an ideal result. While this was not unusual in one eye, some error in *technique* or accident during convalescence had always marred to some extent the result in one eye. In conversation with his colleagues he had been led to believe that this had been their experience also.

A Piece of Glass in the Ciliary Body Located by the Roentgen rays, and Removed with Forceps.—Dr. William M. Sweet reported a case. The injury occurred to an engineer from the explosion, on March 1, of a locomotive oil-glass, a fragment penetrating the cornea in the lower outer quadrant near the sclera, and passing through iris and periphery of lens. When first seen, three months after the accident, the lens had been absorbed, but haziness of the vitreous prevented a view of the interior of the globe. Radiographs indicated that a body, casting a fainter shadow than is usual with metallic substances, was situated close to the ciliary body at its lower temporal portion. On October 6 an iridectomy was performed through an incision at the lower outer corneo-scleral junction, and a pair of iris forceps passed to the spot indicated by the radiographs. After a number of attempts, a mass of exudate containing the piece of glass was drawn into the anterior chamber and removed. Warm saline solution was injected into the globe to replace the vitreous lost. The glass was 5 mm. long, 3 mm. wide, and 1·5 mm. thick. Very little reaction followed the operation, the corneal wound healing on the third day and the man being discharged on the eighth day. The vitreous was still hazy, but the eye was quiet, with prospect of a serviceable ball, and possibly some sight.

Traumatic Paralysis of the Ocular Muscles.—Dr. G. E. de Schweinitz, after a brief reference to the literature of traumatic paralysis of the ocular muscles, reported the following cases:—Paralysis of the left inferior rectus from a knife-thrust, advancement of the severed tendon and tenotomy of the superior rectus, cure; division of the pulley of the superior oblique during an operation for abscess of the orbit caused by suppurating ethmoiditis, spontaneous disappearance of the diplopia, restoration of the normal rotations of the eye; injury of the superior oblique and superior rectus during an operation for the removal of a tumour from the orbit, the patient still under treatment; paresis of the right inferior rectus following a fall on the right side of the head, spontaneous recovery; paralysis of the left superior rectus and left levator palpebræ following a fall upon the left side of the head and forehead, spontaneous disappearance of the ptosis, persistence of the paralysis of the left superior rectus, binocular single vision secured by tenotomy of the left inferior rectus; paresis of the right superior oblique following a fall on the right supra-orbital region, later paresis of accommodation, complete recovery; paresis of the left inferior rectus following a fall on the head succeeded by concussion of the brain, recovery; paralysis of the left superior oblique following a fall on the head succeeded by severe concussion of the brain, recovery. Of the five cases of palsy not produced by direct traumatism Dr. de Schweinitz attributed two to a basal lesion, one almost certainly being associated with fracture, one to a nuclear lesion in the anterior portion of the third nerve nucleus, and the other possibly to a nuclear lesion. In one case the evidences of injury were so slight, with the exception of the paralysis of the inferior rectus, that no satisfactory localisation of the lesion could be made.

Dr. S. D. Risley recalled the history of a case, presented to the Section last year, of a man who had been thrown from his buggy. When seen three months later there was a nearly complete paralysis of all the ocular muscles on the right side supplied by the third nerve except the levator. He presented also the history of two cases which properly belonged to the first group. A lad had received a thrust from the ferrule of an umbrella which detached the whole or a large portion of the tendon of the internal rectus and lacerated extensively the conjunctiva and capsule from the upper and inner quadrant of the eyeball, pushing it backward. As these tissues had fastened themselves to the sclera in an abnormal position, and diplopia existed, the tendon of the internus and the torn tissues were separated from their faulty attachment and brought forward, with the result that the diplopia disappeared. In the second case the tendon of the inferior rectus had been severed from the ball with considerable laceration of the capsule to the temporal side, causing vertical diplopia, violent attacks of headache, and inability to use the eyes. There was marked rotation of the vertical meridian of the cornea. The tendon of the internus was brought forward, with the result of relieving the vertical diplopia, except during fatigue or when looking downward and to the left, when there would first be considerable confusion of vision, then a recurrence of the diplopia with nausea and occipital pain. The capsule and overlying tissues at the temporal side of the inferior rectus were then detached and brought forward and the diplopia and asthenopia quickly disappeared. Dr. B. Alexander Randall referred to a case of paralysis of the inferior rectus, decreasing when he first saw the man, in which complete recovery followed absorptive treatment. In a child with paralysis of the superior rectus and levator muscles, from penetration of a cow's horn, perfect success followed picking up the rectus muscle and stitching it in place, but the result of operation upon the levator muscle was not so good.

William M. Sweet,
Clerk of Section.

THE INTER-PUPILLARY, OR THE INTER-AXIAL DISTANCE.

By Ernest E. Maddox.

It may be of service to add one more to the already many useful applications of ophthalmoscopic reflections, to which attention was first drawn by Priestley Smith in 1888, for strabismometry. While granting fully that the inter-pupillary distance can for all ordinary purposes be sufficiently well estimated by almost a glance, or at least by the simple modes of measurement in current use, there remains to be dealt with a class of cases in which some accuracy is required, as for instance in very high myopia, in double aphakia, and whenever decentering is resorted to for the purpose of securing a definite prismatic effect.

Moreover, it is sometimes desirable to take into account a marked difference in the height of the two eyes, especially for adjusting the line which divides bi-focal lenses, and for the correction of hyperphoria when co-existent with considerable ametropia. Although some of the subjective methods are quite accurate in principle, they require some skill on the part of the patient, and are seldom used.

In the current objective methods the chief sources of inaccuracy are that :—

(*a*) They locate the pupils only, instead of the visual axes, whereas what we want to know for optical purposes is the inter-axial rather than the inter-pupillary distance, and especially is this so in cases of misplaced pupils, or of high angle gamma.

(*b*) The measurements are vitiated by errors of parallax from undetermined position of the surgeon's observing eye.

It was to overcome this last difficulty that I once designed a little "localiser" for placing in the cell of a trial-frame and furnished with two "sights" or "bearings" to enable the surgeon to take his aim correctly.[1] But this only located the pupils.

Since investigating the very close degree of approximation by which the visual axis is mapped out on the cornea by the reflection from an ophthalmoscope, at the central hole of which the patient is directed to look,[2] it occurred to me that this reflection affords the truest and indeed the only rational landmark for determining either the horizontal distance between the visual axes or the optical elevation of one eye above the other, for there is in most people a vertical angle gamma as well as a horizontal one.

Happily this truest landmark is also found to be the easiest, for so bright and so small a luminous spot as the reflection affords (the position too of which, unlike the pupillary margin, suffers no displacement under changing illumination), can be located with almost the precision of an astronomical observation. A modification of my former instrument for this purpose is shown in the figure, and is made by Messrs. Botwright and Grey."[3]

The rectangular notch and the white triangle form the two "sights," the latter being projected on an arm which brings it at least an inch nearer to the surgeon's eye than the notch. The instrument is intended to be placed in any ordinary screwing trial-frame from which measurements can be read off.

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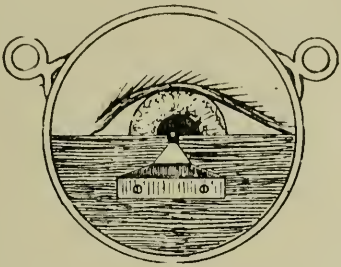
[1] "Prisms, &c." (1889), p. 59.

[2] "Tests and Studies of the Ocular Muscles," p. 330.

[3] 13, Spencer Street, London, E.C.

In another design a gilt wire forms one of the "sights." To localise the visual axis the first thing to do is to raise or lower the trial frame till the two sights and the star are on the same level, then rotate the horizontal screw till they fall in one line.



In emmetropia the distance between the ordinary position of the visual axis and the centre of the corneal reflection is, as I have shown elsewhere, so inconsiderable as to be less than the tenth of a millimetre—for every practical purpose therefore they coincide. In the absence, however, of an ophthalmoscope, symmetrical parts of the reflections from a window can be utilised.

NOTES OF TWO CASES OF TOBACCO AMBLYOPIA.

By Cecil E. Shaw, M.A., M.D.

Assistant Surgeon to the Belfast Ophthalmic Hospital, &c.

These two cases seem worth recording, on account of the youth of the patient in the first case, and in the second on account of the fact that for nine months previous to the appearance of the amblyopia the consumption of tobacco had been greatly lessened, and was well within what is generally considered a safe limit.

Case 1.—C. M., aged 15. A strong healthy-looking lad. He began to smoke cigarettes when 8 years old, and has smoked regularly since. For the past year he has smoked a penny packet (five) "Wild Woodbine" cigarettes daily. His vision began to fail very recently, and is now $\frac{5}{24}$ in each eye. Refraction is normal, and the media clear. The discs show signs of atrophy on the temporal sides.

There is a central scotoma for colours in each eye. The right eye was examined with the perimeter, and showed an irregular triangular scotoma for colours, with its apex at the disc and its base running nearly vertically just outside the macula. The field for white was normal, for colours contracted.

Case 2.—T. N., aged 40. Insurance agent. Patient is a rather delicate-looking man, but has an excellent family history. He is ninth of eleven children, all living and healthy except one who was killed in a railway accident. An elder brother suffered from tobacco amblyopia, but recovered. Patient married when 25, and has seven children, all healthy. He has always had good health. He began to chew tobacco when 9, and for some years chewed about half an ounce a week. From 15 to 26 he chewed generally about four ounces a week, but often rose to an ounce a day. After marrying he came to the conclusion that chewing was "a dirty habit" and gave it up, taking to smoking instead. He generally smoked half an ounce a day, but sometimes an ounce. About a year ago he thought he was smoking too much, and since then has smoked from one to two ounces a week, never more. He is and has always been temperate. Three months ago his sight began to fail. He tried glasses, but finding them no help he came to hospital. In each eye V. = $\frac{5}{60}$ and $\frac{5}{36}$, but he can see parts only of the letters, he says, and it is only by looking from side to side that he can make them out correctly. Refraction and media normal. Colour vision very defective, if not quite lost. The right eye, examined by the perimeter, shows a large absolute scotoma, very irregular in shape but roughly oval, extending from the disc outwards about 10° beyond the macula. The fields for white and green are normal, for red greatly contracted. There seems to be a large scotoma for green in the lower part of the field, but the patient tired easily, and his answering became unsatisfactory. He has been put on Liquor Strychniæ, and says he is improving.

REVIEWS.

NUEL (Liege). On the Pathological Anatomy of Toxic Optic Neuritis. *Arch. d'Ophtalmol., October,* 1900.

[This article, which is mainly an account of a research on filicic optic neuritis, opens with a short note on the structures of the optic nerve and on the method of hardening and staining them.]

The neuroglia forms a species of very incomplete sheath for each nerve fibre, composed of longitudinal bundles of neuroglia fibres united laterally. To prevent the neuroglia presenting the appearance of "a granular mass including some fibrils" according to the stereotyped phrase, it is necessary to place the fresh nerve in a hardening fluid that does not alter the neuroglia. A 3 per cent. solution of bichromate of potassium is very suitable; it may be employed at first, or after hardening of the nerve in formol, while alcohol, and more especially Müller's fluid, is to be avoided. Fuchsine, which colours the nerve fibres a little differently from the neuroglia fibres, is a useful staining agent.

From his researches on filicic optic neuritis Nuel has been able to study an optic neuritis in its different phases, and notably to distinguish between the initial lesion and the subsequent secondary changes in the optic nerve. The neuroglia may be studied under highly favourable conditions in filicic neuritis.

It is in this way that the author has been able to recognise the commencement and true significance of certain pathological appearances which every one has met with in man, but the correct interpretation of which has remained doubtful. Independently of its intrinsic value filicic optic neuritis serves as a type of neuritic processes in general,—processes which in man present themselves in various phases of development.

From the third to the fifth day of filicic amaurosis, and still later, after complete or almost complete disappearance of the nerve fibres, the neuroglia of the optic nerve is isolated in an ideal manner, and is more or less distended by interstitial œdema. Then occur the peculiar changes of the neuroglia: proliferation of the fibrils and nuclei, or hypertrophy of the neuroglia, soon followed, or accompanied, or even preceded, by softening. The author particularly insists on the fact that the dense nucleation results exclusively from increase of the neuroglia nuclei. Softening of the neuroglia appears in various forms which imperceptibly merge the one into the other. The most curious variety is that in which epithelioid cells are formed. In this variety the greatly proliferated small neuroglia cells rapidly acquire considerable dimensions, and form large transparent cellular bodies, the nucleus remaining small and angular. At the same time the greatly proliferated neuroglia fibres very rapidly completely disappear. The epithelioid cells become polyhedral, they usually have one nucleus, sometimes two, and rarely more. These cells become granular, frayed at their edges, and by-and-bye entirely disappear. After resorption of the epithelioid cells, cavities are left filled with a clear fluid and traversed by greatly altered vessels. The nerve may thus in large parts be transformed into a hollow tube having walls formed by slightly thickened pial sheath, lined by a coating, often very fine, of hypertrophied and sclerosed neuroglia. In the foci of softening the vessel walls become thickened and hyper-nucleated, the endothelial cells increase and more or less obstruct the lumen. There is also new formation of capillary vessels, and the connective tissue surrounding the vessels is hypertrophied. The author has not met this mode of softening in other forms of optic neuritis either in man or (experimentally) in animals. These epithelioid cells play the part of macrophages. In another form of softening of the hypertrophied neuroglia, small cells play the same part as the epithelioid cells of the first form, viz., they dissolve the neuroglia. Usually, however, in the second form the necrobiosis is more pronounced, the vascular changes, endovasculitis and occlusion of the vessels, are more marked that when there is formation of epithelioid cells. This form (by small cells), limited to parts where the neuroglia softens without previous hypertrophy, constitutes a third form of softening that might well be termed necrobiotic. This true necrosis of neuroglia greatly predominates in septic forms of optic neuritis. In filicic optic neuritis it is met with for the most part near the eye, where the process is most acute.

The author emphasises the fact that at the beginning of this neuritis the blood vessels are normal, as well as the connective-tissue septa which support them. Migration of leucocytes is insignificant or even absent, a fact which appears to be common to all forms of amicrobic optic neuritis. Filicic optic neuritis is then a parenchymatous neuritis, characterised by a primary lesion and destruction of nerve fibres; only later are secondary changes produced in the interstitial tissue, first in the neuroglia, and afterwards in the vessels and connective tissue. In certain parts of the nerves the subsequent changes assume exactly the characters that are considered pathognomonic of the neuritis called interstitial. In filicic neuritis papillitis is the more worthy of remark when it occurs, since in other cases of this same affection it may be quite absent.

Interstitial œdema of the nerve plays a considerable part in rather acute forms of neuritis, sometimes as cause, sometimes as an element in the neuritic process. Nuel has observed, in preparations of M. Bourdilles, what he considers to be numerous lymphatic capillaries between the connective tissue portion and the neuroglia portion of the septa, the presence of which, previously unsuspected, explains the facility with which interstitial œdema separates the connective tissue from the neuro-neuroglia bundles.

The changes in the nerve at the optic canal come on later, yet develop more rapidly and in a different manner, so that at a subsequent stage it might be believed that the changes had originated here, and that they were those of so-called interstitial neuritis. This peculiarity may quite well be common to different forms of optic neuritis. In a case of neuritis following panophthalmitis which certainly originated at the eye and ascended afterwards towards the cranium, the changes were very markedly more advanced at the optic canal than in the orbit and at the eye. The rapidity with which the nerve fibres become destroyed cannot be explained by a primary lesion of their cells alone; a simultaneous, or nearly simultaneous, lesion of the nerve as well must be supposed. Filicic amblyopia depends upon a process essentially different from that of quinine amblyopia, the primary lesion of which is in the nerve cells of the retina. In a few cases of recent, more or less acute, neuritis in man, as well as in different experimental neurites, some microbic, others amicrobic, Nuel found, without exception, one or other form of the very early changes which occur in filicic neuritis, that is to say, they all merited the name of parenchymatous neuritis. In all the nerve fibres were impaired and even destroyed; this was accompanied by interstitial œdema, often very marked, and there was present one or other of the initial changes of the neuroglia found in filicic neuritis except the formation of epithelioid cells. The connective tissue septa were not manifestly hypertrophied in any of them. There could be no question of the neuro-neuroglia bundles having been compressed by the connective tissue septa.

Until further information is obtained, Nuel holds that all forms of optic neuritis, provided they are fairly acute, are parenchymatous. This proposition must be kept specially in view as regards alcohol-tobacco neuritis, the ultimatum refugium of interstitial neuritis. It is the type of a chronic neuritis. All discussion as to the nature of the neuritic process would cease, if the study of a chronic neuritis could be made similar to that of filicic neuritis.

As a matter of fact authors have always had to deal with old cases, they have examined phases of a process that has developed in the course of months or even years. But in sub-acute and acute forms of neuritis the nerve fibres are the elements first affected, next, or even simultaneously with the nerve fibres the neuroglia, only lastly the connective tissue and the vessels. Acute alcoholic amblyopia notably seems to be of this number. It is then quite natural to suppose that it is the same for chronic changes of the optic nerve. We know nothing as yet of the manner in which the neuroglia behaves in alcohol-tobacco neuritis.

As to the interstitial connective tissue and the vessels, two forms of alteration can be distinguished in them. In one, the form more especially alcoholic, the hypertrophied connective tissue is rich in cells. It is this form which Uhthoff has met with especially, and which authors call interstitial neuritis. In the other form the septa and vascular walls alike hypertrophy, often even in a marked degree. This hypertrophy presents itself rather in the form of connective-tissue sclerosis. Lamellæ of thickened hyaline connective tissue are formed with cells interposed, which are elongated, fusiform, and less numerous than in the first form. It is a condition somewhat analogous to that produced eventually in simple secondary degeneration, and to that which de Schweinitz has described in an advanced stage of quinine amblyopia.

C. H. U.

SALZMANN (Vienna). The Zonula Ciliaris, and its Relation to Neighbouring Structures. *F. Deuticke, Leipzig and Vienna,* 1900.

In this monograph of 88 pages the author gives, in much detail, an account of his investigations concerning the zonula ciliaris in the human eye. The article, which affords evidence of much careful work by the writer, and contains a great deal that is of interest, suffers, in our opinion, from the very common fault of present day papers, namely, an inordinate length. It is furnished with nineteen illustrations and a useful bibliography.

Salzmann divides his volume into five chapters. The first, which is very brief, deals with the fibres of the zonula. The writer describes the microscopical appearances and structure of the zonula fibres, and draws attention to the considerable variation in size which they exhibit. The finest fibres he considers as primitive fibrils, the coarser as due to the blending of several such fibrils. The division of a large fibre into its component fibrils can be readily demonstrated. The zonula has attachments to three neighbouring structures, the lens capsule, the tissue between the retina and the vitreous, and the vitreous body.

In Chapter II., also short, the author describes the attachments of the zonula to the lens capsule. The fibres of the zonula join the capsule of the lens at very varying angles; some approach it at a tangent, others almost at a right angle. Another difference is that those which are tangential in direction become slightly broader, but do not subdivide until they reach the capsule, where they spread out in very fine diverging fibrils. The others, those which join at right angles, break up into their primitive fibrils before they impinge on the lens capsule and undergo no further subdivision. The fibres of the zonula are firmly attached to the surface of the lens capsule, but do not penetrate it.

In Chapter III., entitled "The Attachments of the Zonula to the Pars Ciliaris Retinæ," Salzmann begins by describing fully the minute anatomy of the pars ciliaris retinæ, in which he differentiates four layers. These are, in order from without inwards: (1) an outer hyaline membrane, continuous posteriorly with the lamina vitrea chorioideæ; (2) a pigmented epithelium, which is a direct prolongation of the retinal pigment epithelium, and closely resembles it in its general characters; (3) an unpigmented epithelium composed of cylindrical cells; (4) an inner hyaline membrane of delicate homogeneous structure, from which the zonula chiefly springs. (This layer must not be confused with the hyaloid of the vitreous.) In the second part of this chapter the attachment of the zonula to the pars ciliaris is described. This attachment is effected by means of the finest fibrils, except at the orbicularis ciliaris, where Salzmann thinks some larger fibres pass to the inner hyaline membrane, beyond which, *i.e.*, *external* to which, no fibrils of the zonula can be traced. Some of the fibres are united to the flat inner surface of the hyaline membrane, while others, which the author considers the more important, are attached to the ridges or processes which project from the outer surface of the membrane into the subjacent unpigmented epithelial layer.

Chapter IV. is headed "The Vitreous Body and its Connections with the Zonula." Thirteen pages are devoted to the structure of the anterior portion of the vitreous body. This is followed by a description of the attachments of the vitreous body to the inner hyaline membrane of the pars ciliaris retinæ, and this, again, by the connection of the vitreous body with the lens capsule. In the remainder of the chapter, some fifteen pages, we find a detailed account of the connection between the vitreous body and the zonula. Salzmann divides previous writers on this subject into two groups, one of which maintained that there was a direct continuity between the zonula and the vitreous, and the other of which held the opposite view. This difference of opinion, he thinks, was mainly accounted for by different, and often imperfect, methods of preparing and examining the tissues in question. Salzmann's views are that some fibres of the zonula pass through the outermost layers of the vitreous and unite with its hyaloid membrane. Such fibres can undoubtedly be shown in the ciliary zone of the hyaloid. He admits the probability of such fibres in the area of the pars optica retinæ, although he has never demonstrated them to his own satisfaction. Other zonula fibres undoubtedly become united with the vitreous body, and the opinion of the older writers that zonula fibres arise from the vitreous is, Salzmann holds, true in substance, although the number of such fibres is, he believes, very small.

The last chapter concerns the bibliography of the zonula, and the importance of a knowledge of this to the comprehension of the mechanics of accommodation. From his investigations the author concludes that Helmholtz's theory of accommodation best conforms to the anatomical arrangements of the zonula and crystalline lens.

WARRINGTON and DUTTON. Observations on the Course of the Optic Fibres in a Case of Unilateral Optic Atrophy. (*From the Thompson-Yates Laboratory, Liverpool*). *Brain, No.* 92, *Winter*, 1900.

THE authors publish these observations *apropos* of the interest aroused in the question of decussation of optic nerve fibres at the chiasma in man by recent experiments and reports by Kölliker, Michel and others, who support the view that complete decussation takes place. In his latest communication (1899) Kölliker gives an account of his observations on the course of fibres in the chiasma of sheep, cats and man. The results he has obtained are, that in man it is impossible that any considerable number of fibres pass to the tract of the same side as the optic nerve from which they are derived, though he admits the existence of a very small number of direct fibres. In addition to this conclusion he has noticed the important fact that in the cow, cat, rabbit and dog, a division of individual fibres takes place in such a manner that a fibre from one optic nerve passes to the two tracts. In man Kölliker was only able to find in his specimens one such fibre. Should further observations demonstrate that division of fibres is a constant occurrence in the chiasma, Kölliker considers this fact would remove in considerable part the physiological objections to this view. Finally, he urges that the minute anatomy of the chiasma must be more thoroughly observed before the question is settled.

Michel maintains, first, that serial sections of the chiasma give no support to the view of semi-decussation; second, that investigations of degenerations in man and animals give no evidence of a non-crossed bundle of fibres; third, that if homonymous bilateral hemianopsia is to be explained by the decussation in the chiasma, the proportion of crossed to uncrossed fibres should be as 1 to 1, whereas it is admitted by the believers in partial decussation that the relation is 3 to 1 or 4 to 1. Michel also states that no anatomical evidence has yet been produced demonstrating a double representation of the macula, which is required by the theory of semi-decussation in order to explain the freedom of the fixation-point in cases of hemianopia.

Warrington and Dutton's case was that of a female, aged 63, who died of malignant disease of the liver six months after removal of her right eye, which had been injured three years previously. The authors record: (1) the resulting degeneration in the nerve, chiasma, and optic tracts; (2) the existence of undegenerated fibres in the atrophied nerve; (3) the condition of the oculomotorius nucleus. They also give illustrations of the microscopic appearances. Their case seems to show clearly the existence and arrangement of a semi-decussation of nerve fibres in the chiasma.

After treatment in Marchi's fluid, the tissues for examination were cut and stained by acid hæmatoxylin, and treated by Pal's fluids.

The Resulting Degenerations of the Nerve Chiasma and Tracts.—Naked-eye examination of the sections showed that the right optic nerve was completely degenerated, being white and shrunken. The optic tracts were plainly seen to contain sclerosed tissue, which stood out markedly in contrast to the black-stained nerve fibres.

Optic Nerves.—The left nerve showed the normal structure. The right practically consisted of fibrous tissue. It was much shrunken, and complete atrophy appeared to have taken place. Careful examination, however, with a $\frac{1}{12}$ inch immersion lens discovered a few normal nerve fibres scattered irregularly over the area of the section.

In diameter they never measured more than 1·5μ, and hence belonged to the smallest of the optic nerve fibres.

Chiasma.—The chiasma with the optic nerves attached was cut in a complete series of about 500 horizontal sections, and every fourth one stained. By this means the course of the degenerated tracts could be fairly well traced, and is shown in the authors' diagrams. In the sections about the median plane, the atrophy from the right nerve is seen spreading in the central portion of the right tract, and occupying the front and back of the chiasma, its extent being larger in the latter situation. As the sections approached the upper and lower surfaces the distribution of atrophied tissue was less defined, and the intermingling of normal fibres was greater. The general relations were, however, the same.

Right Optic Tract.—Sections near the chiasma showed that the atrophy occupied a central position, extending further outwards than inwards. Microscopical examination revealed that in no part was there complete atrophy, normal nerve fibres being found in the most affected part of the tract. Many of the normal fibres found were of small diameter, 1·5 to 2μ, only a minority being as large in diameter as 5 to 7·5μ. The same general distribution was noted in the sections taken from the more centrally situated part of the tract, but the extent of the atrophy gradually diminished.

At the commencement of the level of the external geniculate body no obvious degeneration was seen, but the fibres on the outer part of the tract were considerably larger and more numerous than those on its inner aspect. Sections through the geniculate body showed that its cellular mass was richly covered by fibres of a large diameter; those deeper in its substance were much smaller.

Left Optic Tract.—In sections near the chiasma the degeneration is well seen situated peripherally, and chiefly on the inner and inferior aspect of the tract. It is nowhere complete, normal nerve fibres being present in the connective tissue; its extent gradually diminishes as it is traced centrally. Near the geniculate body the area of degeneration could no longer be observed with the naked eye, but on microscopical examination the inferior region was found scantily supplied with nerve fibres. No obvious difference in size was found between those normal nerve fibres situated in the atrophied region and those composing the undegenerated portion of the optic tract.

On the Existence of Undegenerated Fibres in the Atrophied Nerve.—In the stump of the atrophied nerve very fine normal nerve fibres were found. These fine fibres, from various observations by other writers, may belong to centrifugal neurons, though there is no satisfactory evidence as to the position of their cell origin.

On the Condition of the Oculo-motorius Nucleus.—The cells of the nucleus were throughout normal. The writers suggest that this is the result of repair. It is now well known that section of an axis cylinder is followed, in general after a short time, by the change known as chromatolysis in its nerve cell. Further, that after a considerable period the cells so affected tend gradually to return to their normal condition. In this case it is possible that repair may have taken place before death, as observation by several writers shows that after a period of 100 days no very obvious difference is noticeable in any group of cells whose axons have been cut.

J. B. L.

FUCHS (Vienna). Emphysema about the Eye. *Wiener klinische Wochenschrift*, 4, 1901.

Emphysema about the eye, which is a condition as frequently seen perhaps by the general surgeon as by the ophthalmologist, may be present in the lids, in the orbit, or under the conjunctiva, the first being the most usual and the last-mentioned the rarest situation for the presence of the air. When the orbital tissue is affected it is not always easy to diagnose between air and blood behind the globe, but the increase of the proptosis on expiratory effort is an important sign; in the case of subconjunctival emphysema the membrane may be so blown up as to stand like a wall round the corneal margin, presenting a most curious appearance.

For the occurrence of emphysema it is obvious that three conditions are essential,—a communication between air passages and the cellular tissue, the forcing of air through this aperture during expiration, and the absence of any external wound, for if there were an external wound the air would escape through it and not blow up the tissues. It is almost always immediately or very soon after the injury that the emphysema occurs, because blood may trickle down, or there may be some uneasiness which causes the patient to use the handkerchief, but occasionally a considerable time elapses. Fuchs mentions a case of his own in which the patient sneezed some thirty-six hours after a blow with a piece of iron which had ruptured one globe, whereupon copious emphysematous inflation of the opposite orbit took place. In a case of Knapp's three days had elapsed, and in another of Gosselin's twenty-four years!

It is not very plain in what precise manner the fracture occurs. The usual explanation is that the inner wall of the orbit (for the bones of the roof and floor of the orbit are too strong) gives way as the result of *contre-coup*, the blow being applied to the orbital margin. The os planum, or lamina papyracea, of the ethmoid, which forms part of the inner wall of the orbit, is extremely fragile, and may give way even to a comparatively light touch of the finger, but it is rather towards the base of the skull that the force of the impact would be, and indeed as we know from other cases is, conducted. Fuchs thinks it more probable that the blow forces the globe itself against the delicate ethmoid, pushing aside the cushion of fat which lies between, and that it is actually the impact of the firm eyeball which produces the fracture of the os planum. He is the more inclined to this view that in his experience he has never seen emphysema co-existing with typical scleral rupture. The two conditions appear to be antagonistic: if the globe gives way the orbital wall escapes. Under his direction experimental investigations were made by striking blows with a wooden hammer upon the eye of a cadaver, the force being so graduated as not to rupture the globe. In this manner he succeeded in causing fracture of the orbital portion of the ethmoid and permitting the passage of air or coloured fluids from the nose into the orbit; that it was from the blow that the fracture resulted and not from the forced passage of the fluid was shown by the fact that the little portion of bone was depressed away from the orbit and not into it.

The cases which have been observed now and again, in which a fall or blow on the back of the head has been followed by emphysema, are not so simple to explain. It might be supposed to be a fracture of the skull, but how extensively in such a case must the fissures run! And besides that, in Hilbert's case the patient had been so little injured that he had at once returned to work, and the emphysema had not come on for three hours. It is scarcely credible that this patient could have had a lesion so extensive. Several instances are on record, however, in which emphysema took place on violent use of the handkerchief without any previous injury whatever. Desmarres had a very singular case of this sort, inasmuch as the condition was chronic, and the patient could produce ptosis whenever he chose by simply blowing his nose vigorously. Desmarres attributed this condition to a rupture of the lachrymal sac, but Fuchs is dubious as to the correctness of this explanation. It is very doubtful whether, even on the most violent blowing, any air can be driven into the sac under normal conditions, and he thinks a fracture or fissure of the ethmoid is even in such a case the more likely explanation. It is true that under really normal conditions this could hardly occur, but there may be some bone disease in the neighbourhood, or even an old injury, as in Gosselin's case above referred to. Schanz has also recorded a very curious case in which a glass blower was in the custom of blowing so hard with his cheeks that he could inflate his parotid glands with air, and Steno's ducts were much dilated. On one occasion when sneezing he felt a violent pain in the right eye, which at the same time was "blown out" beyond the lids by emphysema: it was replaced, but shortly afterwards came out again; neuritis occurred in that nerve, and vision was eventually considerably reduced.

In some of the cases in which repeated emphysema of the orbit, without affection of the subcutaneous tissue, is the form taken, it is quite possible that there is a diverticulum of the mucous membrane of the air passages outwards into the orbit, which under even slight expiratory pressure becomes distended, as for example on singing, as was the case in a patient's of Rampoldi's. Fuchs himself had a case in which on vigorous nose-blowing an old lady used to blow out a mass the size of a nut under the inner end of one eyebrow; this, he thinks, could be produced by nothing but such a diverticulum.

W. G. S.

GONIN (Lausanne). The Annular Scotoma of Pigmentary Retinitis. *Annales d'Oculistique, February*, 1901.

Gonin in this interesting and instructive article, besides furnishing a series of six cases which came under his own observation, has collected twenty others of a similar nature from various records. In all of these the condition of retinitis pigmentosa was associated with the presence of an annular scotoma occupying the zone intermediate between the peripheral and central portions of the field of vision.

The author holds that this peculiarity should be found, if carefully looked for, in most if not in all cases of this pigmentary degenerative change. It occurs at a comparatively early stage of the affection, and he attributes the rarity of such observations to the slow and insidious onset of the disease, so that when the patient ultimately seeks advice the condition has reached a later stage.

Clinically, he finds that the marginal scotoma, usually described as one of the prominent symptoms of the affection, has in many cases also an outer margin, beyond which the visual function is still maintained. The gradual extension of the annular scotoma, both outwards and inwards, ultimately abolishes the outer visual area by involving the extreme limits of the visual field. There only remains, then, the central area of vision, which gradually decreases in size, owing to the centripetal advance of the scotoma. This forms the ordinary feature of the disease.

Pathologically, the change is found to be a degeneration occurring in the outer layers of the retina—the rods and cones,—which are dependent on the adjacent capillary plexus of the choroid for their supply of nourishment. It has been fully demonstrated that the arterial system of the choroid is formed by recurrent branches from the long anterior ciliary arteries passing backwards and anastomosing with fine capillaries, which are the continuation of the short posterior ciliary vessels. Naturally the effects of any degenerative change in this vascular network will first become apparent in the most terminal twigs, and then gradually march along the line of the vessels; in this instance that would be, in relation to the globe of the eye, both backwards and forwards. The tissues which they supply in like manner undergo degenerative alterations. The position of this fine anastomosis is in immediate relation to the intermediate zone of the field of vision, and the progressive extension of the annular scotoma coincides with the alterations occurring in the finer vessels. The visual function is locally extinguished by the degeneration present in the outer layers of the retina, but is primarily caused by changes in the fine vascular system of the choroid, which gradually spread along the course of the vessels.

The presence of the annular scotoma, together with its mode and rate of increase and the final conversion of the field of vision into the concentrically-reduced area more frequently observed, is thus satisfactorily explained.

KENNETH SCOTT.

C. ZIEM (Danzig). The Relation of Nasal Disease to Cataract. *Wochenschrift für Therapie und Hygiene des Auges, xiii. and xiv.*, 1901.

Nasal diseases are considered in this paper, first in respect that they may lessen visual acuity in cases of unripe cataract, and have an influence on the formation of senile cataract in general; and secondly, as regards their importance in view of operations for cataract. When commencing cataract is associated with nasal disease or empyema of the antrum of Highmore, it will be found that the visual acuity is less than can be accounted for by the opacity of the lens merely. Particulars of five such cases are given in the paper. The improvement in visual acuity obtained by treatment shown in a tabulated form:—

(1) R.E., $< \frac{5}{60}$ to $\frac{5}{24}$; $\frac{5}{18}$. L.E., $< \frac{3}{60}$ to $\frac{5}{24}$.
(2) R.E., no improvement. L.E., $\frac{5}{60}$ to $\frac{5}{18}$.
(3) R.E., $\frac{5}{24}$ to $\frac{5}{9}$. L.E., no improvement.
(4) R.E., $\frac{5}{60}$ to $\frac{5}{18}$. L.E., $\frac{5}{60}$ to $\frac{5}{36}$.
(5) R.E., $\frac{5}{18}$ to $\frac{5}{9}$. L.E., $\frac{5}{36}$ to $\frac{5}{18}$.

The failure to obtain improvement in two instances is thus accounted for: the right eye in case No. 2 had detachment of the retina, and had been nearly blind for many years; while the left eye in case No. 3 presented a considerably advanced cataract.

In case No. 1 the nose and antra were washed out with normal saline solution; in cases 2, 3 and 4 the nose was washed out and "Drouot's plasters" were applied behind the auricles; in case 5 the plasters alone were used. All testing of vision was done under equal artificial lights.

This improvement of vision is to be attributed, according to the author, to the fact that the disturbed circulation of the choroid and pigment epithelium of the retina is set right, and the functional disorder of the retina, so caused, disappears. He points out that the washing out of the nose with normal saline solution, even in cases of "cold in the head," produces a feeling of greater ease and relieves the congestion. This is due to the influence of such a solution on the lymphatic or venous system of the nose and the neighbouring regions (including more particularly —for the purposes of this paper—the eye).

The "Drouot's plasters" act by derivation of blood through the anastomosis of the deep veins of the pharynx and nasopharynx with those of the auricular region, as is easily seen by the diminution in swelling of the mucous membrane of the nose and even of the antrum.

To these views it has been objected by Kuhnt that many patients are unable to breathe through the nose, yet they do not suffer from grave ocular diseases, and that of the patients who present functional disorders of the eye, due presumably to an empyema of the antrum, many are much run down in general bodily health; Kuhnt would refer such eye symptoms rather to an intoxication of the nervous system, derived from the pus of the empyema, &c. In Ziem's opinion probably the vascular engorgement and the intoxication may both be at work.

As a substitute for operative procedures in cases of unripe cataracts, this washing out of the nose, &c., would appear, in suitable instances, to be of some merit: such at all events is the author's view.

As regards the effect of nasal diseases on the ætiology of general senile cataracts, the author dilates at some length. Alluding first of all to gout, rheumatism, scrofula, &c., as well recognised causes [?] of cataract formation, Ziem finds that among patients suffering from opacities of the lens and vitreous associated with empyema of the antrum of Highmore, an improvement, as far as the *mouches volantes* are concerned, has certainly been brought about by treatment of the empyema.

Next, the frequent occurrence of senile cataract in countries in which infectious fevers are endemic is touched upon, with more particular reference to India. With Hirschberg's view that the hot Indian sun may have a direct causal action in forming lens opacities Ziem does not agree, holding that nature by a darker, more pigmented, iris, or by different shape of the lids (the slit-like eyes of the Mongolian, the almond eyes of the Egyptian, &c.) counteracts such influence of the heat rays. He is more inclined to refer the early formation of senile cataract which occurs in such countries to the fact that there the infectious fevers are of common occurrence, and consequently variations in the circulation occur more easily, and so the opacity commences to form.

Hirschberg, moreover, has pointed out that in Germany early senile cataracts are more common among agricultural labourers than among dwellers in cities, and attributes this perhaps to the more direct influence of the sun's rays on the lenses of those who pass much of their time in open air. Ziem considers rather that the miserable dwellings of the agricultural labourers and their lowered state of health are the cause, and draws attention to the fact that among the dwellers in the Tyrol, Styria, &c., cataracts are common, where the heat of the sun is not so great as to be a factor. His view is that the general moisture of the atmosphere and the dampness of the houses should be regarded as the cause, first of all of frequent "colds in the head," and thus, perhaps, of early cataract formation. With reference to this point of view, he instances the liability of cooks and washerwomen to "colds in the head," and so connects their special liability to cataract-formation with their occupations.

The dangers incident to the presence of nasal disease when an operation for cataract is to be performed are well recognised and need not be dwelt upon.

FRANK C. CRAWLEY.

A. TERSON (Paris). Chirurgie Oculaire. *Paris: J. B. Baillière et Fils*, 1901.

We can recommend this little volume as an interesting and scientific account of the various operations which are customarily performed upon the eye. In its pages the author confines himself strictly to his programme, as laid down in the preface, avoiding all such extraneous matter as description of the anatomy of the parts, and of the antiseptic precautions to be observed, and dealing strictly with the description of the *technique*, the indications for operation, the choice of the particular form or variety of procedure, and a brief review of the origin of the precise methods, and of the evolution of the diverse plans of various operators. It is naturally a little difficult to steer between a meaningless list of trifling variations, on the one hand, and the omission of important modifications in detail on the other, but Terson has succeeded wonderfully in this task. A careful description is given also in regard especially to the chief operation of ophthalmology, namely, the extraction of cataract, of such accidents and complications as may arise during the performance, or be present beforehand, and good advice is added as to the manner in which these should be met. It is not to be supposed that anyone would be found to agree with *all* of Terson's dicta, but no surgeon could fail to be the better for the careful study of his book. The illustrations are numerous and helpful.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, MARCH 14, 1901.

G. ANDERSON CRITCHETT, F.R.C.S.Edin., President, in the Chair.

Evolution of the Colour-sense.—Dr. Edridge-Green read a highly original paper on this subject. As far as time permitted, he expounded his theory of colour-vision, which is completely at variance with those generally held. According to him, the machinery for the discrimination of colour lies not in the retina but in the brain cells, and instead of there being particular fibres in the optic nerves which have to do with the perception of particular colours, the differences in the various light waves are continued and carried on by corresponding differences in the nature of the impulses conveyed by the nerve fibres to the brain. The chemical changes by which the colour waves are transformed into nervous impulses take place in the visual purple, and according to this theory, the cones alone are the termination of nerve fibres, the rods being the reservoirs for the visual purple whose function it is to act upon the cones. The power of perceiving differences of colour resides in the brain, and the number of different colours that can be perceived depends on the stage of evolution attained by the brain cells. The facts of colour-blindness throw a good deal of light on the evolution of the colour sense. Colour-blind individuals can be arranged in a series. "At one end of this series are the normal sighted, and at the other end the totally colour-blind. I have classified them in accordance with the number of colours they see in the spectrum, as pentachromic, tetrachromic, trichromic, dichromic, and monochromic. All the facts which can be gained from the study of museums and literature point to the view that the sense of light was developed first and then the sense of colour, those waves which differ from each other most, physically, being first perceived as different, namely, red and violet. . . . The spectrum was, therefore, first seen as grey, then with a tinge of red at one end and violet at the other. As the colour sense developed it was not necessary that the rays should be so far apart before a difference was seen, and so the grey band gradually diminished until it entirely disappeared and the two colours met in the centre of the spectrum. A third colour, green, then appeared at the central point; then yellow appeared, making four colours; then blue making five; and finally orange, making the normal six. In some persons evolution has proceeded further and seven colours are seen, there being two colours between the green and the violet instead of one. We find that paintings were first monochromatic, then red and violet were used as colours, then green, then yellow, and then blue. Homer's colour vision was of the degree just preceding total colour-blindness. The description by different authors of the rainbow as having one, two, three, four, five, six, or seven colours, is very characteristic. These facts show that colour-blindness is only an example of an earlier stage in the development of the colour-perceiving centre." There was another and distinct class of colour-blindness in which there was a defect not only for colour but for light. These were the cases when the spectrum was shortened at one end.

The President was afraid that if the subject of colour-blindness was made so complex it would be more difficult than ever to get any effective action from the Board of Trade in the direction of better colour tests.

Dr. Edridge-Green thought that the Board of Trade had been unjustly blamed in this matter. He blamed the Committee of the Royal Society who had been appointed to investigate the matter and reported in favour of Holmgren's test.

On the value of Peritomy in Episcleritis, Iritis, Herpes Ophthalmicus and Purulent Ophthalmia.—Mr. T. Pridgin Teale. In the first place, Mr. Teale explained what he meant by peritomy, viz., "the laying bare by scissors of about a quarter of an inch in breadth of the sclera immediately surrounding the cornea, and the dividing all the vessels in that area which enter or emerge from the sclera, without any cutting away of tissue." In severe cases he made radial cuts into the separated tissue, but he did not remove any of it. He had first seen good results from this treatment in cases of interstial keratitis and these led him to extend it to other diseases. Cases were related under each of the heads included in the title of the paper to show its beneficial effects. In an obstinate case of double iritis he had performed a combined iridectomy and peritomy on each eye during the acute stage, whereas without the precaution of peritomy, he would never have ventured to do iridectomy in such a case. There were perhaps few affections of the eye more to be dreaded than the ulceration of the cornea associated with herpes, and he had employed peritomy in two such cases with encouraging results. He had employed it in one case of secondary glaucoma with temporary benefit, but did not claim that the evidence in favour of it in such cases was on a par with that in the cases referred to in the title of his paper.

The President said that the late Mr. Critchett, and he himself, frequently employed peritomy in cases of pannus, but always removed some tissue with the object of producing a cicatricial band. He attributed the good results which invariably ensued to the scar, which acted as a species of pathological Esmarch's bandage over the vessels which were encroaching on the cornea.

Mr. Cartwright remarked that this explanation of the good effects of peritomy would not hold good in cases other than pannus,—cases when the congested vessels were deep. He suggested that it might act in the same way as counter-irritation.

Mr. Johnson Taylor asked whether Mr. Teale ever did a partial peritomy.

Mr. Hern said that during the last ten years he had done the operation eighty-six times. In cases of interstitial keratitis it had been wonderfully successful, and in about thirty cases of episcleritis in which he had employed it there had been some benefit in every case.

Mr. Secker Walker had also had a large experience of the operation and considered it of great value, but thought that perhaps its least use was in interstitial keratitis. In this disease he had often treated both eyes, one with peritomy and the other without, and had not been able to convince himself of its value in these cases. He believed the action was that of a powerful and prolonged leeching.

In reply, Mr. Teale said that he never removed any tissue. The only case in which harm had resulted from the operation was one of extensive ulceration of the cornea, in which the peritomised conjunctiva came over and seemed to grow to the corneal surface. In reply to Mr. Taylor he did sometimes do a partial peritomy when the congested area was less than a fourth of the corneal circumference. He was very interested in what the President had said of his late father's practice, and thought that whatever the explanation of its good effect might be, the operation he advocated was a valuable addition to the surgeon's armament.

Notes on a Case of Membranous Conjunctivitis.—Mr. J. F. Bullar. The case occurred in a baby a fortnight old, one eye alone being affected. At the time the membrane lining both lids was easily removed in one piece and the conjunctiva beneath bled but very slightly. After this the eye was treated merely with nitrate of silver, two grains to the ounce, and got rapidly better, but five days after the membrane had been removed from the conjunctiva, a membrane appeared on the fauces, and very soon the child died in convulsions. Until the more serious symptoms appeared the disease had not been regarded as anything more than local.

The President recommended the local application of quinine in these cases. It was Mr. Tweedy's plan, but he stipulated that the drug must be absolutely pure.

Mr. Stephenson said he saw a fair number of cases of membranous conjunctivitis every year, and in any case at all suspicious occurring in hospital, he invariably ordered a liberal dose of antitoxine without awaiting the bacteriological report. He had seen nothing but good result from such action, but had had reason to regret its omission.

Mr. Lang remarked that Mr. Tweedy's prescription of quinine dated from præ-antitoxine days.

The President said that he and Mr. Tweedy employed both methods of treatment.

Mr. Devereux Marshall also spoke strongly in favour of the early employment of antitoxine.

Cases and Instruments.

A Capsulotomy Knife.—Mr. G. Hartridge. The knife was made with a slight curve in the blade and a sharp double-edged cutting point. It was intended to be entered at the corneo-scleral junction on the flat, and afterwards turned with the point of the knife towards the capsule or iris, the non-cutting portion of the knife being round.

A Case of Central Choroiditis Simulating a Neoplasm, watched for fourteen years.—Mr. G. Hartridge.

A Diagrammatic Model to assist in the teaching of Refraction.—Mr. H. Secker Walker.

A New Colour Perimeter.—Mr. J. H. Tomlinson.

Coloboma of the Optic Nerve (left).—Mr. J. H. Parsons. A well marked case in a girl of 10.

Corneal Microscope.—Mr. Kenneth Scott.

Immobility of Both Pupils with fine Fundus Changes.—Mr. G. W. Roll.

Section Showing Medullated Nerve Fibres in the Retina.—Mr. P. Flemming. The section showed that the nerve fibres lose their myelin sheaths abruptly at the posterior end of the lamina cribrosa and regard them at irregular intervals. The opaque fibres had been noted ophthalmoscopically during life.[1]

A New Ophthalmoscope.—Mr. R. W. Doyne. A piece of plane transparent glass set at an angle reflects sufficient light to illuminate the fundus, or an ordinary spectacle lens may be used. Mr. Doyne discovered this useful fact when in the country without his ophthalmoscope.

A Case of High Hypermetropia (15 D. in each eye).—Mr. Work Dodd.

CLINICAL NOTES.

Exophthalmic Goitre with Increased Tension.—Brailey and Eyre report a series of five cases, all occurring in the persons of young women under 25, in whom, along with the ordinary symptoms of Graves' disease, there were visual manifestations due to increase in the intraocular tension. Certain of the conclusions drawn by the authors from careful notes taken as the cases proceeded, are worthy of attention. Such are: (1) that the increase of the tension is attended with the usual signs of increased pressure, viz., pulsation of the vessels, cupping of the disc, limitation of the field, and diminished acuteness of vision ; (2) that the high tension is usually, but not always, bilateral, and often varies from time to time ; (3) that the tendency is for a return to normal, though that may not be for months or even years ; (4) that owing to the elasticity of the tissues, vision generally returns on pressure being relieved, and that therefore the whole is probably due to the nervous and muscular disturbances which are at the root of the malady, (5) and that there is often deep central pitting, which, however, generally implicates less than a fourth part of the disc surface. The present writer does not feel that he could for his own part regard pitting as decidedly pathological which implicated only a small part of the disc, and he must confess also that in several of the cases the fields of vision, as represented in the charts given, are not such as to suggest that the symptoms were due to pathological increase of tension. —*Guy's Hospital Reports*, vol. liv.

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[1] Compare figure illustrating Mr. Usher's paper in Ophthalmic Review, Vol. xv., p. 1.

Optic Atrophy following Mumps.—Among the complications and sequelæ of mumps, any ocular troubles are rare. Dor relates a case of optic atrophy following cynanche, of which the following brief notes may be given. A young soldier of 23 was affected by mumps, which happened to be prevalent in his regiment, and passed through a fairly severe attack, and at the end of a month was alarmed to find his vision failing very rapidly ; objects appeared misshapen and surrounded by a cloud ; so rapidly did his sight deteriorate that after a few days only he was hardly able to guide himself. Three months later, when Dor first saw him, he had slight bilateral exophthalmos, the field of the right eye was much restricted to the nasal side, and there was paralysis of the internal rectus ; the pupils were slightly dilated and immobile ; the media were transparent. The patient could not count fingers; ophthalmoscopically there was evident the aspect of a neuro-retinitis passing into atrophy, which unfortunately proceeded in spite of treatment, and though the patient improved in other respects, vision remained nearly as bad as ever. Dor reports also another similar case.—*La Clinique Ophtalmologique*, August 25, 1900.

OPTIC ATROPHY RESULTING FROM ELECTRIC SHOCK.—The following case is described by Ulbrich :—As a coachman was driving across the lines of an electric railway his horse fell, and on the man attempting to lift off the connecting wire which lay across the animal, he experienced a violent shock which threw him to the ground. He was unconscious for about a quarter of an hour, after which time he was able to lead home his horse, and though he felt headache and sickness all the evening was able to go to work again next day. He observed, however, that the sight was rapidly becoming bad and by the third day the right eye was blind. He presented himself at hospital on the fourteenth day, when it was found that he had some ptosis on each side, which gave him a "sleepy" look, the right eye was somewhat divergent, and its downward movement was imperfect, and the pupil was slightly dilated and quite immobile. The right eye was entirely blind, the left had $\frac{5}{20}$. The ophthalmoscope revealed bilateral optic atrophy, the discs were white, with clearly-defined margins, the vessels of normal calibre; the field of vision of the left eye was markedly restricted in certain directions, especially when tested with a coloured test object; colours were imperfectly identified. Thirteen days later herpes ophthalmicus came on on the left side, lasting six days, after which vision sank to $\frac{1}{10}$, at which it has remained. The author is uncertain whether a hæmorrhage (such as has been produced experimentally by means of strong electrical discharge) or a direct electrical injury of the optic nerves, the right third nerve, and possibly the right ciliary ganglion, has been the precise cause; he puts aside as improbable the idea that the patient may have damaged his head or fractured his skull merely in falling, since there were no other symptoms of any such injury.—*Correspondenz-Blatt des Vereins deutscher Aerzte.* Quoted in *Centralblatt für Augenheilkunde*, September, 1900.

EXTRACTION OF CATARACT IN THE DOG.—Valude describes the difficulties met with by him in the course of extraction of cataract in dogs. In the dog the lens is, relatively to the dimensions of the globe, about twice the size of the human crystalline, and has, moreover, a very dense, tough capsule. The original incision therefore requires to be large, and any secondary operation is exceedingly difficult to carry out. Besides this, the cortical masses in the dog are very viscous and adhesive, and therefore are got rid of with great difficulty. He found that after each instillation of atropine there was copious salivation, while the animal made constant movements of salivation and mastication for some half hour or so. In the animal in question vision, even after a "needling" with Graefe's knife, was not good, and so great had been the difficulties encountered that he resolved in the case of the second eye to perform couching; however, though the lens remained displaced after the operation, vision was lost by copious hæmorrhage into the vitreous and subsequent formation of fibrous tissue. He is of opinion that in addition to the difficulties indicated above, the anatomical structure of parts in the uveal tract militates against success.

Suarez de Mendoza had had better success in one case, in which the dog, after a few trials at which protests were raised, became so well pleased with his spectacles that he used to come voluntarily and thrust his head into the special muzzle which contained them.—*Annales d' Oculistique*, October, 1900.

CURRENT OF DRY HOT AIR.—Wolffberg (Breslau) speaks strongly in favour of the benefit to be derived from the play of a current of heated dry air upon an inflamed eye; the benefit is chiefly in the direction of the relief of symptoms, but in some cases he thought he could attribute to it a curative action. He gives a sketch of a simple method of application of the remedy, which consists of a metal tube heated by gas or other lamps, along which the air is driven, emerging by a flexible tube with suitable mouthpiece. If desired, a thermometer can be fitted to the apparatus.—*Wochenschrift für Therapie und Hygiene des Auges*, October, 1900.

THE INFLUENCE OF NICOTIN ON GANGLION CELLS: ITS BEARING ON THE PATHOLOGY OF TOBACCO-AMBLYOPIA.

By J. Herbert Fisher, M.B., B.S.Lond.

Assistant Surgeon Royal London Ophthalmic Hospital ;
Assistant Ophthalmic Surgeon, St. Thomas's Hospital.

So far as I know, the attention of ophthalmologists has not been particularly drawn to some experimental work by Professor Langley, on the influence of nicotin and certain other drugs on the activity of ganglionic nerve cells. This work was performed some years ago, and the facts are by now well established ; the results of his physiological experiments were first reported in the *Transactions of the Royal Society*, and in the *Journal of Physiology*. Professor Langley proved to complete satisfaction that in the rabbit, cat, or dog, if nicotin be injected into a vein, electrical stimulation of the cervical sympathetic on the proximal side of the superior cervical ganglion failed to produce any secretion of saliva ; the same negative result followed the application of the electrodes to the ganglion itself, but if the stimulus were applied to the nerve fibres between the ganglion and the gland, the gland cells at once actively secreted. This experiment suggested that the interference in the passage of the secretory impulses, as the result of the nicotin toxæmia, was in the ganglion cells themselves ; that this inference was correct was then conclusively proved by exactly the same series of results being obtained when the superior cervical sympathetic ganglion was merely exposed and painted with a solution of nicotin, no injection of the drug being made; when the nerve cord, instead of the ganglion, was similarly painted with nicotin no interference with the passage of the stimuli took place. A similar series of experiments showed that in these animals nicotin inhibited the passage of secretory impulses through the ganglion cells placed on the course of the chorda tympani nerve. A further investigation was made on the splanchnic nerves, stimulation of which, under normal conditions, at once inhibits peristaltic movements of the bowel and stomach; here again after the exhibition of nicotin the splanchnics, when stimulated, failed to arrest these movements, and the experiments conclusively proved that the impulses thrown into the splanchnic nerve fibres failed to traverse the cells of the ganglion of the solar plexus.

Professor Langley has further proved that in an animal under the influence of nicotin the cells of the ciliary ganglion form a "fault" in the transmission of impulses to the sphincter pupillæ, and the superior cervical sympathetic ganglion cells an obstacle in the path of stimuli to dilate the pupil. He has also extended the same series of observations to nerve fibrils which end by means of ganglionic connections in voluntary muscles, using the extra-ocular muscles for this demonstration. Similar results were obtained as regards the vaso-motor nerves. In every instance, when the animal was under the influence of nicotin injected into a vein, a stimulus applied on the proximal side of a ganglion, or on the ganglion itself, failed to produce any result, while the same stimulus applied to nerve fibres connecting the ganglion and its work, was as efficacious as if no nicotin had been employed; in every instance the experiments produced identical results when, without intravenous injection, the appropriate ganglion was exposed and its surface painted with a solution of nicotin.

Nerve impulses, then, whether motor to striped or unstriped muscle, secretory, vaso-motor, or inhibitory, are arrested in an animal under nicotin, if, and only if, they have to traverse ganglion cells ; this fact is so certain that Professor Langley now, when experimenting, if he wishes to know if impulses are transmitted along nerve fibres direct, or only by synapse through cells of a ganglion, repeats any experiment he may be making, first injecting the animal with nicotin ; if the impulses now, of whatever nature, fail to pass, he is sure ganglion cells are in the path.

It occurs to me that these well demonstrated facts should be of interest to ophthalmologists in regard to the cases of chronic poisoning with nicotin which we know as tobacco-amblyopia. Up to now we have regarded these cases as examples of retro-bulbar neuritis, but I doubt if anyone is conscientiously satisfied why nicotin affects the papillo-macular bundle alone of all the fibres of the optic nerve. If it be fair to extend Langley's results to the specialised impulses which the optic nerves convey from their end organs to the brain, we should infer that the impulses originated in the macular cones reach the brain only after transmission through ganglion cells, while those started in more peripheral parts of the retina pass without such interruption along more direct nerve fibres. For myself, I am not inclined to think there is any real reason why what has already been shown to apply to impulses of very different characters, should not also be true of visual impulses. The optic nerve is susceptible to electrical and mechanical stimuli, and if it be argued that it is not comparable to a peripheral nerve, but is developmentally a part of the central nervous system, I think we have now advanced beyond such coarse anatomical distinction when we regard each nerve cell as a neuron, and each nerve fibre as the axon of such a cell, and all nerve matter to be built up from these two rudiments. Moreover, Schäfer has no hesitation in making Langley's results applicable to the central nervous system.

In vol. ii. of his recent "Physiology" he says: "The effect of drugs in diminishing or increasing the resistance of the nerve centres to the passage of nervous impulses may be produced in the same way," *i.e.*, by interference in the synapses, possibly by alteration of the nerve cell processes diminishing or increasing the intervals. "It appears certain that nicotin, in blocking the passage of nervous impulses along a nerve path, acts on the synapses. This conjecture opens up a wide field of speculation, since it is possible to extend it so as to embrace the explanation of many physiological and psychical conditions. Lépine has invoked it to explain the production of both natural and hypnotic sleep."

Do the nerve impulses of the macular region, then, pass through nerve cells *en route* for the cerebral cortex, and do those of more peripheral parts of the retina not do so? At first sight we might be inclined to look for such ganglion cells in the path, in the external geniculate body, pulvinar or anterior corpus quadrigeminum; but at this distance from the retina the macular bundle can no longer be identified among the fibres of the optic tract; nerve cells are of course found in these grey nuclei, but what their connections are is uncertain; Wernicke considers that some fibres, the so-called fibrillary bundle, do pass direct to the occipital cortex through the posterior part of the internal capsule without relation to the primary optic ganglia, and it may be that all do so without relationship to the cells of the basal grey matter among which they thread their way. I do not think, however, it would be here that we should expect to find the impulses checked in ganglion cells by nicotin; the changes in the optic nerve, in cases of tobacco-amblyopia, have been sufficiently proved by Nettleship and many others, and are universally recognised; all however, do not admit that they indicate a partial interstitial neuritis; and whatever their nature, it does not follow that these changes in a sector only of the optic nerve, so difficult to explain as the result of a general toxæmia, are the only or even the primary change; but seeing that changes tending towards, or indicative of, an atrophy of afferent fibres are found in the optic nerve, we should naturally look on the peripheral side of this lesion for the primary change. That there are ganglion cells between the rod and cone and nerve fibre layers of the retina we all know. Dr. Gaskell, in a recent communication to the Anatomical Society, comparing the simple retina of some of the lower animals with the compound retina of vertebrata, pointed out that each develops in contact with a portion of the brain which forms the primary optic ganglion; in both classes the brain subsequently withdraws from the surface; in animals with a simple retina (*e.g.*, the arachnida), the whole optic ganglion withdraws, leaving behind a simple retina connected to it by the optic nerve, while in the vertebrata the line of cleavage is different; a part of the primary optic ganglion remains attached to the primitive retina and renders it compound, while the remainder withdraws with the brain, again connected to the retina by an optic nerve composed of the elongated processes of the nerve cells left behind; this part of the optic ganglion left fused with the primitive retina Professor Gaskell terms the "retinal ganglion," and he considers it to be represented by the inner molecular and ganglionic layers.

If it be proved that the majority of the impulses aroused in the cones of the macular region pass through ganglion cells in their transmission to the cerebral cortex, while those originated in peripheral parts of the retina do not, or if there be one more synapse to be traversed by the macular impulses than by the peripheral impulses, it seems to me that in the light of Professor Langley's results we have for the first time a satisfactory explanation of the central scotoma which is the characteristic feature of tobacco-amblyopia.

In favour of the existence of this difference in the paths, I will point to the following observations :—

In Quain's "Anatomy," vol. iii., part 3, we find: "Most of the nerve fibres are continuous with the axis cylinder processes of the cells of the next layer, but some are continued through the second and third layers and end by ramifying either in the inner molecular layer or amongst the elements of the fourth layer (inner granules), the terminations being frequently knobbed or enlarged."

Sir Michael Foster, in his "Text-book of Physiology," vol. iv., says: "We can trace optic fibres through, or apart from, the ganglionic cells to the inner molecular layer, and there we lose them too."

There are, then, fibres of the optic nerve which are not the axons of cells of the ganglionic layer. To confirm this I have endeavoured to find an estimate of the total number of cells composing the ganglion layer of the human retina so as to be able to compare this figure with the estimated number of fibres in the optic nerve. I can find no figures as to the number of ganglion cells. According to Krause, in the optic nerve there are 400,000 broad, and as many narrow fibres, so that for every fibre there are 7 cones, about 100 rods, and 7 pigment cells. I have failed to find any estimate of the number of ganglion cells in the macular region of the retina; we know that the fibres of the macular bundle amount to about one fourth of the total number in the optic nerve; we know also that at the margin of the fovea the ganglion cells are closely packed in layers, nine to ten deep, while a little farther from the central region they form a single layer, and towards the periphery these cells are separated by considerable intervals one from another. This arrangement seems very suggestive that every impulse originated in a macular cone is transmitted through a ganglion cell to the axon of that cell, while more peripherally where we have at least 100 rods and 7 cones to 1 nerve fibre and the ganglion cells form only a very incomplete single layer, it is obvious that many rods and cones, if they initiate impulses, must forward them, so to speak, in packets to a single nerve fibre, and must do so, for the most part, without transmission through a ganglion cell; the ganglion cells here must surely be fewer than the nerve fibres.

In Fuchs' "Text-book of Ophthalmology," p. 403, I find, "The part of the retina which is the most completely equipped for vision is the fovea centralis—within it, the terminal elements, which here are exclusively cones, are more densely set than in any other part of the retina. Each one of them has probably a special nerve fibre all to itself which connects it with the brain, while in the peripheral part of the retina it is always the case that several terminal organs are conjointly continuous with one single nerve fibre."

It has been argued by more than one observer that the primary change in tobacco-amblyopia is in the cells of the ganglion layer, but some of my readers may possibly have overlooked this theory, and I feel sure the majority are so imbued with the view that these cases are due to a partial retrobulbar neuritis, that they have attributed little importance to the alternative explanation.

De Schweinitz, in vol. iv. of Norris and Oliver's

"Diseases of the Eye," writes: "Another explanation is suggested by the theory—now receiving histological proof—that the earliest lesions in intoxication-amblyopia are to be found in the ganglion cells of the retina and in the nerve fibre layer. It is readily conceivable that the macular ganglion cells may suffer from a lesion sufficient to cause visual disturbance, which disappears, with consequent improvement in acuity of sight, under the influence of rest, improved hygiene, &c., precisely as we know that the constitution of ganglion cells elsewhere in the body is demonstrably structurally different after enforced exercise and electrical stimulation from what it is after rest. If improper stimulation is long continued, permanent lesions are established in these cells. So also if the influence of the toxic agent is exerted for undue periods of time, degeneration of the macular ganglion cells ensues, together with secondary changes in the optic nerve."

Nuel has especially contended for the retinal origin of the symptoms and pathological changes in cases of tobacco-amblyopia; to quote de Schweinitz again:—

"Recently Nuel has contended that the central toxic scotoma is not primarily the result of a neuritis of the macular bundles, but of a disease of the macula lutea, causing degeneration of its cells, and that the optic nerve changes are secondary to destruction of the nerve cells of the macula. He bases his views on microscopical examination of a specimen in which the ganglion cells were atrophied. . . . There is no doubt that there may be a retinal origin of degeneration of the papillo-macular bundle, or, indeed, of more extensive disease of the entire nerve, and clinically we know that in atrophic central retino-choroiditis, or in so-called macular coloboma, there will be a quadrant atrophy of the optic nerve, precisely as this is seen in cases of intoxication-amblyopia. . . . Ophthalmoscopically, changes in the macula have been described, although they were not attributed to the influence of the toxic agent. Sachs and the author have carefully examined the ganglion cells of the macula in cases of toxic amblyopia and found them normal, or at least, only slightly changed, although the entire macular tract was atrophied; but their investigations were made with the ordinary histological methods, and before the Nissl stain was known. Hence their value is indifferent. In Widmark's case the nerve fibre layer between the macula and papilla was thinner than normal, and the ganglion cells somewhat less numerous."

Nuel's work is reported in the *Arch. d'Ophtalmologie*, 1896; the changes in the ganglion cells he describes were very marked and unmistakable; in large part the cells had completely disappeared, and those remaining were shrunken and atrophic. I have myself, under care at the present time, a patient recovering from tobacco-amblyopia who presents quite obvious faint macular change in each eye. Most definite changes in the ganglion cells of the retina have been pathologically found, and figured by Holden in cases of quinine-amblyopia, and proved to be the primary lesion in this form of toxæmia, followed at a later date only by obvious changes in the fibres of the optic nerve.

I am aware, therefore, that I am not putting forward an altogether new view of tobacco-amblyopia; what I have endeavoured to adduce are some new arguments based on proved physiological experiments in favour of the view which at present obtains the assent only of the minority; with Professor Langley's work as a basis, to argue that the central amblyopia in nicotin poisoning is due to an interruption in the transmission of those impulses which have to pass through the ganglion cells upon which the alkaloid acts, and to point to some histological facts which, if this view is admitted, will enable us to explain more satisfactorily than hitherto why direct vision suffers out of all proportion to indirect vision in tobacco-amblyopia.

REVIEWS.

GROENOUW (Breslau). Ophthalmia Neonatorum, in its Clinical and Bacteriological Aspects. *v. Graefe's Archiv. für Ophthalmologie, lii.* 1, p. 1.

Although it has been known for a considerable time that other organisms besides the gonococcus of Neisser may be responsible for various forms of ophthalmia in the newborn, no extensive series of investigations has hitherto been undertaken to ascertain the relative frequency of this occurrence. In the present paper the author gives the result of his examination of 100 cases which he observed in Breslau between May 1897, and June 1900.

All cases of conjunctivitis of the new-born were examined, not only those of blennorrhœa, but those also which had the clinical aspect of mere catarrh. Especial value from the bacteriological point of view was attributed to those cases that had not been treated before presenting themselves.

In all cases a loop of a sterilised platinum wire was passed over the fornix of the conjunctiva of the lower lid. The secretion thus obtained—along with mucous and purulent flakes—whenever possible, was inoculated on ox-blood serum mixed with sugar bouillon, and on ordinary serum. One or more cover-glass specimens were also made, and stained with Loeffler's methylene blue, and when necessary by Gram's method. Cultures were also made in meat extract, peptone, bouillon, and on agar, and gelatine made with this bouillon; also in milk and on potatoes, all under the strictest precautions to avoid contamination.

The author corroborates the experience of others that ophthalmia neonatorum, comprising both simple catarrhs of the conjunctiva and undoubted blennorrhœa, may be produced by various kinds of micro-organisms, viz., gonococcus, pneumococcus, streptococcus pyogenes, bacterium coli, and possibly staphylococcus pyogenes aureus.

Severe blennorrhœa is caused, in the majority of cases, by the gonococcus; still there are on the one hand instances where gonococcus cannot be found, and on the other a gonococcal conjunctivitis may clinically take the course of a simple conjunctival catarrh without any blennorrhœic character. It may also be noted that no marked difference could be observed in the clinical appearance of cases infected at birth or at a later period.

Gonococcal blennorrhœa has generally a severe course and is of longer duration than blennorrhœa without gonococcus. The number of gonococci found in the cover-glass preparation does not enable us to conclude anything with certainty as to the clinical features and severity of the inflammation. Corneal ulcers, however, were only observed in those instances where gonococci were present, both in the blennorrhœic and non-blennorrhœic cases.

For the purpose of demonstrating the gonococcus it is far safer to make cover-glass preparation than cultures. The latter are not thoroughly to be depended upon, whereas the cover-glass preparation always gave reliable results so long as any secretion was obtainable at all. Of all the cocci found in the conjunctival sac in the cases examined, the gonococcus was the only one which was decolourised by the Gram method.

Absence of gonococcus in a specimen of pus taken before treatment, or after the prolonged application of an antiseptic, may be regarded as justifying a favourable prognosis.

Since gonococci may be found in the conjunctival sac for days and weeks after the cessation of purulent secretion, it is necessary to continue the applications of silver solution for some time after all purulent secretion has stopped, a point not sufficiently recognised.

In a very considerable number of cases, especially of the lighter forms of conjunctivitis, no pathogenic micro-organisms whatever can be found, in spite of the use of various nutrient media and numerous different modes of examination. Of non-pathogenic micro-organisms the following were found: micrococcus albus non-liquefaciens, various kinds of sarcina, diplococcus roseus (Bumm), bacillus xerosis, and bacillus proteus vulgaris (potato-bacillus).

When blood serum cultures are employed, Neisser's colouring method for the differentiation of the xerosis and diphtheria bacillus scarcely ever gives a positive result with the former until after the lapse of twenty-four hours, sometimes not for several days. It is therefore useless to examine cultures grown on this medium before twenty-four hours at least have elapsed.

With regard to prophylaxis, the author corroborates the observation that Crédé's instillation of solution of nitrate of silver does not prevent the appearance of ophthalmia in every case without exception. On the contrary, it seems not improbable that in some of the less severe cases the inflammation is entirely due to the irritation produced by the silver salt.

K. G.

AAGE MEISLING (Copenhagen). The Field of Vision, as Examined with a Small Test Object. *Annales d'Oculistique, December*, 1900.

Meisling begins with the observation that while it is an easy matter to determine the visual acuity at the macula by testing the form sense with letters in the ordinary way, it is not so easy to determine the visual acuity of other parts of the retina, that is, of the area of retina extending from the macula to the periphery. He draws attention to the inefficiency of the ordinary perimeter for this purpose. As Bjerrum has pointed out, the size of the visual angle subtended by the objectives in common use with the ordinary perimeter is such that considerable reduction in the functional activity of the retina readily escapes notice. Of the different methods which have been employed by various workers for the estimation of the visual acuity of the peripheral portion of the retina, Meisling regards Bjerrum's as the only one of clinical value. All the methods agree in showing that the visual acuity decreases rapidly from the immediate vicinity of the fovea centralis towards the periphery of the retina.

A detailed account of the apparatus which he employed is given, and of the way in which it is used. The following examples are quoted to show the extent of the visual field for small white objectives in the normal eye:—

With a test object of 6 mm. at 2,000 mm. distance, that is, with a test of $\frac{6}{2000}$

Sup. 35°
Int. 40° × Ext. 50°
Inf. 40°

With a $\frac{3}{2000}$ test,

Sup. 25°
Int. 30° × Ext. 35°
Inf. 30°

At two metres distance an objective which subtends an angle of half a degree gives the limitations of the field as with the ordinary perimeter, but with the reduction of the diameter of the objective the extent of the field is proportionately reduced. The blind spot is surrounded by a zone of variable extent, which functionates according to the size of the objective with which it is tested; since the larger objectives are seen while the smaller are not, the zone of absence of sight is increased with the reduction of the objective used.

Slight concentric reductions in the field are not regarded by Meisling as of any special importance, while irregular reductions, as sectors and scotomata, are of great importance.

The following is a brief account of the points given by the author as characteristic in various pathological conditions when the field is taken with the small white objective test (Bjerrum's method).

In disseminated choroiditis, annular or partially annular scotomata are found round the fixation point.

In retinitis pigmentosa, syphilitic choroiditis, and certain cases of irido-cyclitis, considerable diminutions in the visual field are found.

In optic atrophy no characteristic change is found.

In central amblyopia part of the scotoma for colours can always be shown to be absolute by using a sufficiently small objective. The scotoma is found to be in great part or entirely to the outer side of the fixation point.

In glaucoma there are some specially characteristic points well seen on the numerous charts which accompany the original paper. They are described as follows.

First, the visual field, as taken with the ordinary perimeter (test $= \frac{20}{300}$), does not correspond with that taken with the small objective test ($\frac{6}{2000}$). The defects found in the field of vision by examination with the ordinary perimeter are termed *absolute*, while those demonstrated by the small objective test are termed *relative*. The relationship of the area over which vision is most fully preserved to that of relative defect is the point of chief characteristic importance.

Secondly, the area of best vision, as also the area of relative defect, are each in contact with the blind spot; they are said to meet at the blind spot.

Thirdly, scotomata have frequently a paracentral position. They form a characteristic arc round the macular region, either above or below, or both above and below, the concavity being directed towards the fixation point. The scotomata never reach beyond the blind spot towards the temporal side, but may extend to the periphery on the nasal side.

Finally, there are some typical forms of visual field which have a semilunar shape on the temporal side of the blind spot, the blind spot being situated in the concavity of the crescent.

Having thus given a short account of the characteristic peculiarities of the visual field as demonstrated by Bjerrum's method, Meisling proceeds by reference to Bjerrum's former work on the subject.

The form of the visual field is stated to be generally characteristic in glaucoma as opposed to optic atrophy, but may be simulated by fields of vision in retro-bulbar neuritis, in hæmorrhagic papillo-retinitis, and in embolism of a branch of the central artery of the retina. The characteristic form of field is found both in primary and in secondary glaucoma.

A. H. H. SINCLAIR.

HERBERT PARSONS (London). On Dilatation of the Pupil from Stimulation of the Cortex Cerebri. *Brit. Med. Journal, Sept.* 15, 1900.

Parsons, in a short paper, refers to the effects upon pupillary movements obtained by various observers, beginning with Bochefontaine in 1875, from electrical stimulation of the brain. He himself has conducted experiments on dogs and cats, especially the latter. The animals were anæsthetised with A C E mixture, a Dubois-Raymond inductorium was used, with a single Daniel cell. The following is the author's summary of the principal results obtained by him.

(1) Dilatation of the pupil, like other effects of cortical excitation, is best obtained with slight anæsthesia. It often occurs without any movement, either of the eyes or body, but most when the animal is struggling. It is never seen with deep anæsthesia.

(2) It is only obtained from those parts of the brain which are concerned with eye movements, that is, from the anterior part corresponding to the frontal motor area for the eye muscles, and from the posterior part corresponding to the occipital visual centre. The frontal area in the dog and cat is in the neighbourhood of the crucial sulcus, and the pupil effect is usually best obtained from the mesial surface of the hemisphere at this point. The occipital area is the posterior part of the second exterior convolution (Ferrier's).

(3) When well marked, the dilatation of the pupil is accompanied by all the usual effects of stimulating the cervical sympathetic.

(4) The effect is usually more marked upon the opposite eye.

(5) The effect is diminished, but by no means abolished, by section of both sympathetic nerves in the neck. The other sympathetic effects are abolished.

(6) The effect is abolished by section of the oculo-motor nerves intracranially, subsequent to section of the cervical sympathetics. In these conditions the pupils assume the position of *post-mortem* equilibrium, and are immobile. Hence it may be concluded that in the absence of the sympathetic channels the diminished effect is due to inhibition of the tonic action of the third nerves.

(7) The effect is not abolished on either side by section of the corpus callosum. Stimulation of the cut surface of the corpus callosum results in the usual bilateral pupillary reaction.

(8) Stimulation of the central end of the afferent or mixed nerve—for example the sciatic—still causes dilatation of both pupils after section of both cervical sympathetics, that is, a reflex inhibition of the third nerves.

(9) Unequivocal constriction of the pupils from stimulation of the cortex has not as yet been obtained.

J. B. L.

E. ANDRADE (Genoa). Ulcus Rodens Corneæ. *Annali di Ottalmologia, xxix., pt.* 6, 1900.

SCHMIDT-RIMPLER (Göttingen). Ulcus Rodens Corneæ. *Archives of Ophthalmology, March*, 1901.

Ulcus rodens corneæ seems to be a very rare disease, though less so in certain countries than in others, and possibly enough is not always recognised when it does occur. Andrade relates two cases which have come under his notice, and in which he endeavoured, with success as he thinks, to isolate an organism which he regards as the specific cause of the condition.

The first case was that of a man of 37, who came to him in February last after suffering annoyance in the eye for two months previously; he had applied a lotion of sulphate of zinc which had only made him worse. The ulcer was situated at the extreme margin of the cornea, whose centre was perfectly clear, but which appeared reduced in all dimensions by the advance of the conjunctival limb over its edges. Between the clear cornea and this vascular margin was a narrow whitish zone, consisting of the superficial layers of the cornea infiltrated with exudation, underneath which the deeper lying layers were eroded or eaten away to a much greater degree than was apparent on cursory examination; this erosion had not advanced at all deeply into the thickness of the cornea however. It was the upper part of the cornea that was the chief seat of the mischief, and here the protruding conjunctiva looked granulating, having on it here and there yellowish-white nodules; these masses were not present at other parts of the corneo-conjunctival circle, where there was merely hyperæmia and simple swelling. The anterior chamber seemed to be a little deeper than that of the other eye, a fact which Andrade attributed, rightly or wrongly, to a yielding on the part of the central portions of the cornea whereby it had become more convex. The aqueous was quite transparent, the iris greenish, showing some synechiæ; there was no exudation in the pupillary area, tension normal, $V. = \frac{1}{20}$. There was no particular pain or tenderness; the sensibility of the cornea was diminished. The treatment adopted consisted in the subconjunctival injection of corrosive sublimate (1 in 2,000) on three occasions, at intervals of a week, in such a manner that the fluid might be said to surround half the cornea. The margins of the ulcer were cauterised also. Great improvement at once set in and the ulcer rapidly healed, a semi-transparent scar resulting. Five months later the eye was quite well.

The second case was in all essential points similar, and need not be reproduced here; the patient was also a man, aged 53.

Ulcus rodens is a form of corneal affection in which there are certain characteristic features forming a clearly defined pathological entity; a more extended description of it was given in the Ophthalmic Review, 1900, p. 103, in the course of a review of an article by Hillemans. In

Andrade's cases, as usual, the tendency of the ulcer was to spread laterally, by subepithelial infiltration, and there was little or no disposition to penetrate deeply into corneal tissue, much less to pierce through the thickness of that structure. Two processes seem to be always going on in such an ulcer, for as the margin extends in one direction and involves fresh corneal tissue, at the opposite margin the vessels are pushing in and the ulcer is healing. Probably in no uncomplicated case does perforation ever occur, and even the development of hypopyon is exceptional. An interesting feature observed in at least the first of Andrade's cases was the diminution in the sensibility of the cornea; this had been previously remarked upon by Ahlström and Vossius. It is likely enough that many cases may be mistaken for early ulcus serpens, but this mistake ought not to occur, seeing that there are the marked differences noted above; the singular way too, in which the ulcus rodens heals at one margin while advancing at another, and is always more or less peripheral in situation, is a helpful point in the diagnosis. Perhaps the most characteristic feature of all, however, is the undermined margin always present in this disease, a peculiarity which is not only apt to deceive one as to the true extent of the ulcer, but which also very greatly complicates the question of treatment, and accounts to some extent for its persistence and rebelliousness to all applications.

Not only may ulcus rodens be confounded with ulcus serpens, but also with the peripheral ulcers which occur in the cornea in old age; these latter, however, do not heal at one spot while they are advancing elsewhere. They may also be mistaken for a quiescent form of marginal, furrow-like ulcer, which sometimes heals rapidly, but at other times persists off and on for years, but which remains limited to the periphery, never marching into the central part of the cornea. Schmidt-Rimpler suspects that certain of the cases of ulcus rodens reported as cured may in reality have been of this type. In the true variety he thinks, with others, that the curious mode of growth may be due to the germs being kept under shelter, so to speak, at the inner margin, by the overhanging lip of epithelium; they may collect there as in a pocket. These epithelial flaps, too, which hang loose and may be turned over, returning with almost an audible sound to their usual position, may cause much of the irritation.

Among other theories in regard to its etiology, it has been suggested that the ulcer is of neurotrophic origin; but we are familiar already with the true trophic ulcer, which has none of these special characters, and besides, though sensation has been found by some observers (but not by all) to be diminished, it is by no means lost. Tavel, in a case published by Pflüger, stated that he had found a peculiar short bacillus resembling that of diphtheria but he had had no success in inoculation with it.

The only organisms found by Schmidt-Rimpler in the case on which his paper is founded, were various cocci, especially the staphylococcus aureus; they gave no explanation of the peculiar clinical course of ulcus rodens. In this case the patient, who had been under treatment elsewhere, was so weary of the pain and loss of time that he begged for enucleation, and refused to allow any less drastic treatment to be adopted. As regards the anterior portions of the eye, the microscopic examination simply confirmed what other observers have described, but there were also found changes in the retina, especially near the disc. Here the fibres of Müller were hypertrophied, and hæmorrhages were scattered here and there, both in the nerve-fibre and in the ganglion-cell layers; round them were many round cells, and lymphoid cells were scattered elsewhere through the nerve-fibre layer. At some points the internal limiting membrane was broken through, and some round cells lay in the peripheral layers of the vitreous. At one point a circumscribed granular exudation was found between the pigment epithelium and the rods and cones, containing red and white blood corpuscles and round cells filled with pigment.

The Italian author has gone carefully into the bacteriology in his two cases, and found in the yellowish granulation tissue cut from the margin of the ulcer a bacillus which he was able to grow on glycerine agar, and which he thinks may be the true cause of this special variety of keratitis. This organism took the form of rods about the size of the bacterium coli, often united two and two like Morax's bacillus, and was endowed with great mobility. For details as to its behaviour in various media, resistance to temperatures, &c., the original article should be referred to. He introduced a morsel from the margin of the cornea into the anterior chamber of a rabbit, but the irritation produced thereby did not last long though it was lively at first, and the eye quieted down again completely. On infection of the abraded surface of the cornea of a rabbit with a culture, a transitory keratitis occurred, which left behind it a leucoma.

There are great differences of opinion as to the best mode of treatment; most observers, for example, having no faith in the cautery, while Fuchs has found it quite satisfactory, and on the other hand few have seen any benefit from subconjunctival injections, which answered well in Andrade's hands. The great point in any local application is to see that it passes well under the overhanging margin and comes thoroughly in contact with the advancing edge.

The treatment which Schmidt-Rimpler recommends is cauterisation and scraping, though he too thinks Fuchs is too optimistic in regard to the cautery, and he has seen much benefit, in one case at least, from drawing a bridge of conjunctiva over the freshened surface of the ulcer, and allowing it to heal there. He suggests also that when the condition has all healed, leaving a leucoma covering the cornea, it is possible, since the deeper layers and Descemet's membrane are intact, that transplantation of cornea by von Hippel's method might be tried with some prospect of success.

W. G. S.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Clinical Evening, May 2, 1901.

Mr. G. Anderson Critchett, F.R.C.S.Edin., in the Chair.

Pulsating double Exophthalmos following Injury to Head, cured by ligature of Left Common Carotid.—Mr. Nettleship read notes of this case for Dr. D. J. Wood, of Cape Town. About a fortnight after a concussion of the brain from a bicycle accident, the patient, who seemed otherwise well, felt a pain behind the eyes, and noticed that they were becoming prominent. The condition gradually increased, the proptosis being accompanied by pulsation, partial ptosis, nearly complete ophthalmoplegia externa, and optic atrophy, with central scotoma in the left eye. The diagnosis presented no great difficulty, viz., an aneurism by communication between the internal carotid and the cavernous sinus on the left side, causing arterial blood to be pumped into the orbital veins on both sides. About fourteen weeks after the accident the left common carotid was ligatured, with the result that all the symptoms rapidly disappeared, except the injury to the sight of the left eye and paresis of the left sixth nerve, which remained. It was a matter of regret that the operation had been so long delayed.

The President recalled a case of Mr. Hulke's which had been absolutely cured by ligature.

Mr. Treacher Collins related a somewhat similar case in which the pulsating exophthalmos was the result of a bullet, located by the X-rays near the base of the basilar process. In this case, ligature of the common carotid was followed by a recurrence of the symptoms, though to a diminished extent.

Two Cases of congenital Ptosis on which Hess's Operation had been performed.—Mr. G. W. Roll showed these cases. The effect was well maintained after twelve months. The operation was described in vol. xiii. of the OPHTHALMIC REVIEW. He preferred to leave the sutures for fourteen days and to continue them to a point near the free margin of the lid.

The President said he had had some successful and some unsuccessful results from this operation.

Serous Iritis with persistent Tachycardia.—Dr. Rayner Batten showed this case. The pulse-rate varied from 104 to 140, and an adherent pericardium had been diagnosed. There was no enlargement of the thyroid. The keratitis punctata was of the "cold fat drop" variety.

The President said he knew of two cases of serous iritis associated with Graves's disease.

A Case of Choroiditis shown in an early stage in December, 1898.—Mr. G. Hartridge showed this case. The remarkable feature about it was that, though both eyes showed about equally well-marked changes over the whole macular region, the vision of the right eye remained $\frac{6}{6}$, while that of the left had fallen to $\frac{1}{60}$.

The President remarked on a similar variety of effect on vision caused by corneal nebulæ.

Congenital Notch in the outer part of Left Lower Lid and Dermoid Growths of the Conjunctiva.—Mr. Lang showed this case, in which the notch was very small, and Mr. Frost showed another case in which a large coloboma of the upper lid was associated with a dermoid at the outer canthus, a defective external ear, and absent meatus, and two congenital nodules near the angles of the mouth on each side.

Operation for Detached Retina.—Mr. C. Wray showed a young man myopic —15 D. in each eye. In the right eye there had been an extensive detachment, vision being reduced to fingers at one metre. After two scleral punctures and several weeks' rest, with both eyes bandaged, the retina was to a great extent re-attached, the field of vision good, and vision with —15 raised to $\frac{6}{60}$.

The President and Mr. Johnson Taylor both referred to cases in which the result of the operation had been bad.

Mr. Wray referred to a similar case reported by himself to the Society in 1894. In that case vision was increased from blindness to $\frac{1}{24}$, but the eye had since been lost from glaucoma.

Double Temporal Hemianopia with Optic Neuritis.—Dr. A. Hugh Thompson showed this case, which occurred in a young woman of 24, who was told by her medical man that she was pregnant. The partial loss of sight occurred suddenly, three weeks ago, at 5 o'clock in the morning, after violent retching. The field showed loss of the temporal half in each eye, the dividing line being well defined. There was slight neuritis. Both pupils showed the hemianopic pupil reaction to light. The lesion was probably a hæmorrhage affecting the anterior part of the chiasma, and Mr. Marcus Gunn had suggested that the hæmorrhage was probably inside the pial sheath.

The President agreed tha hæmorrhage was a more probable diagnosis than tumour.

A Portable Refractometer.—Mr. C. Blair exhibited this instrument, the weight of which was 8 ozs. It consisted of a frame to be placed on the patient's face, like an ordinary trial frame, but reversible, and carrying before each eye revolving lenses mounted on a primary and secondary wheel. It was chiefly intended to save time and trouble in retinoscopy.

Periscopic Glasses.—Mr. Percival exhibited these. They were designed to enable the wearer to see distinctly objects within a field of 25° from the middle line, by merely rotating his eyes, without any movement of the head. This was effected by grinding the glasses to a curve, such that the confusion circles on the retina could never be greater than the diameter of a retinal cone.

A Thorn removed after Two Months' sojourn in the Eye-ball.—Mr. J. B. Story.

The President had seen a case in which a piece of wood had been in the anterior chamber for twelve years, only giving rise to three or four transient attacks of inflammation.

Serous Iritis with nodular formation.—Dr. Rayner D. Batten.

Primary Chancre of the Lid.—Mr. Wray.

? Exostosis of Frontal Sinus.—Mr. Wray.

Case of Spring Catarrh in the quiescent stage.—Mr. Holmes Spicer.

Results of Tiersch Graft of the Orbit.—Mr. J. Herbert Fisher. A fortnight after exenteration of the orbit for sarcoma, the granulating surface was completely covered with Tiersch's grafts from the patient's arm. With the exception of the graft over the lachrymal groove, they all took well.

Microscopical Sections of Sarcoma of Orbit.—Mr. Simeon Snell.

TRANSACTIONS OF THE HEIDELBERG OPHTHALMOLOGICAL SOCIETY.

Traumatic Iris Cysts.—H. Wintersteiner (Vienna) has examined twelve globes containing iris cysts resulting from injury. The epidermoid and cholesteatomatous cysts he considers may arise from introduction of epithelial cells from any portion of the skin whatever, provided they are able to proliferate ; but for the cysts with semi-fluid contents he thinks Hosch's theory of implantation of glandular epithelium holds good. These cysts are more common than the solid growths. The author records one case in which the cyst implicated the lens, and contained *débris* of lens substance; in other cases the cyst did not lie in the iris completely, but in part had the cornea for its anterior wall. Among the cases are some which support Stoelting's modification of the Buhl-Rothmund theory; this assumes that the epithelium does not reach the iris directly, but spreads first along the walls of the corneal wound. The theory of Eversbusch that these cysts can arise from hæmorrhage into the ligamentum pectinatum lacks still an anatomical demonstration, and the same holds good of de Wecker's theory.

In the discussion Schmidt-Rimpler remarked that de Wecker's theory only applied to spontaneous, not to traumatic cysts.

Excision of Superior Cervical Ganglion for Glaucoma.—K. Grunert (Tübingen). Induced by the example of Jonnescu and others, Hofmeister has performed the above operation in 15 cases: Grunert's paper records these, 11 of which were "gangliectomie" and 4 "sympathicotomie." The results are displayed in tables. Briefly, the author records improvement in 4 cases of chronic "inflammatory" glaucoma; in 3 of glaucoma absolutum 1 failure, 1 good, and 1 poor result; in 2 cases of glaucoma simplex no improvement; in 2 cases of hydrophthalmos no result.

Sympathicotomy was done in 4 cases in order to obviate the atrophy of the dilator iridis, which is believed to follow the removal of its trophic nerves in the ganglion. Of these cases 2 were hydrophthalmos, and no good resulted; 2 were glaucoma simplex, and so far these are improved.

Infectious Optic Neuritis.—W. Uhthoft (Breslau). This paper is a species of supplement to Uhthoff's paper on toxic optic nerve lesions read at the Paris congress.[1] It only deals with cases of general infection, excluding those where orbital, intra-ocular, or intra-cranial disease might have induced the nerve lesions. The affection is not common, for out of 80,000 cases of eye disease in Uhthoff's own practice he can only record 26; including these he has collected 253 cases, grouped as follows: Influenza 72, syphilis acquired 51, hereditary 10, rheumatism 36, malaria 17, typhus abdominalis 17, measles 9, diphtheria 6, polyneuritis 7, variola 6, beri-beri 5, erysipelas 3, scarlatina 3, tuberculosis 3, typhus exanthematicus 3, gonorrhœa 2, typhus recurrens 2, acute rheumatism of joints 1.

In influenza the affection is a neuritis, usually a papillitis, more rarely a retro-bulbar neuritis. It occurs most frequently in the state of convalescence. In syphilis, too, papillitis is the usual, and retro-bulbar neuritis the uncommon type. In malaria the lesion is a neuritis undoubtedly. We must also remember that retinal changes may be induced by quinine.

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[1] See OPHTHALMIC REVIEW, 1901, p. 33.

Optic nerve lesions certainly have resulted from typhus abdominalis, but the observations of optic nerve lesions in other fevers leave it doubtful whether other factors (meningitis, albuminuria, &c.) may not have been present. But few undoubted cases of optic neuritis after diphtheria are on record, though they certainly occur, as also after polyneuritis and beri-beri ; but Uhthoff doubts the occurrence of isolated optic neuritis in variola. Optic neuritis has been recorded as resulting from numerous other diseases than those mentioned above, but the presence of other factors is probable in nearly all the cases.

This infectious optic neuritis occurs in the stage of convalescence, and is probably due to the action of toxines and not of micro-organisms directly. The neuritis does not differ in the different maladies.

In the discussion Herzog stated that optic neuritis had been observed to recur a second time after a second attack of influenza. He mentioned Berger's theory to account for the rheumatic neuritis—inflammation spreading from spaces in the bone between the canalis opticus and the sphenoidal sinus.

Methyl alcohol Amblyopia.—A. Birch-Hirschfeld (Leipzig) has experimented on rabbits and chickens to ascertain (1) if the retinal ganglion cells are affected by the above poison at a time when the optic nerve is still intact ; (2) if so, what is the lesion ? (3) whether degeneration of nerve fibres follows ; and (4) whether the anatomical condition is different from that in other toxic amblyopias, especially the chronic alcoholic ?

The poison acted immediately, producing a condition of stupor for some hours, which gradually passed off. The pupils were at first dilated and inactive ; but reaction often returned for a time, to disappear subsequently. All cases died after some weeks of malnutrition with fatty degeneration of liver and kidneys.

Ophthalmoscopically neither neuritis, vascular lesions, nor atrophy were visible. But the retina showed extensive degenerative changes in the ganglion cells, and also in the nuclear layers. These changes were irregularly scattered through the retina, sound cells in close juxtaposition to diseased cells. No changes were observed in the blood vessels. In only one case were degenerative changes in the optic nerve, and these were in a wedge-shaped area at the temporal side of the nerve, which contained normal as well as diseased fibres. In this pathological condition methyl-alcohol seems to act similarly to ethyl alcohol, but what part the ganglion cells have in the pathology of the amblyopia of ethylic alcohol amblyopia is yet uncertain.

In the discussion Uhthoff argued that clinically the common alcoholic amblyopia could not be regarded as a primary affection of the ganglion cells ; it is a primary partial interstitial neuritis.

Luxatio Lentis.—Schmidt-Rimpler (Göttingen). This paper records a case of luxatio lentis in a man of 45, whose mother and maternal grandfather also suffered from the same lesion, as well as some of his children. Diagnosis was made at age of 8, when the lenses lay in the pupillary area. At present they lie at the bottom of the vitreous, and vision with convex glasses is good.

Of this man's children one boy of 18 and one of 9 have the lenses luxated, a boy of 15 has iridodonesis and movable lenses, though not actually luxated, and a boy and girl of 1½ (twins) have iridodonesis, and deeply placed lenses. Three other children have normal eyes.

Congenital Korectopia with Luxatio Lentis.—E. v. Hippel (Heidelberg) was able to obtain anatomical examination of two eyes so affected, this being the first case of such on record. v. Hippel believes the deformity was produced by the presence of a fibro-vascular structure extending from the vitreous to the iris which hindered the growth of the iris and tended to dislocate the lens, and adopts a view which is in strict harmony with Hess' observations upon similar mesodermic structures.

Suprarenin.—K. Wessely (Heidelberg). Suprarenin is a substance obtained by Fuerth from the suprarenal body, which has also been used by Landolt and others as a substitute for the recent extract. Wessely used in his observations a ¼ per cent. solution in normal salt solution. This was injected subconjunctivally into rabbits. The first result of the injection is maximal mydriasis, of which later.

The vessels of the ciliary body contract as do those of the conjunctiva ; this was shown by subsequently injecting fluorescin and finding that Ehrlich's line was not visible half an hour later, nor any colour in the aqueous. The second eye was used as a control in all the observations. Under suprarenin, even when the aqueous was evacuated, the pupil remained wide, and the aqueous was secreted more slowly than in the other eye, and contained hardly more albumen than the normal percentage ; the tension too remained subnormal for a longer period. If this experiment was combined with intravenous injection of fluorescin, the result was even more striking, for a whole hour elapsed before a fine Ehrlich's line and a faint colouration of the aqueous were visible. The signs of hyperæmia of the ciliary vessels excited by chemical irritants to the cornea were also delayed or abolished by suprarenin. Subconjunctival injection of 5 per cent. salt solution is known to act as an irritant to the ciliary body, inducing an increase of the albumen in the aqueous (a fact which possibly may have some bearing on the therapeutic action of subconjunctival injections), but suprarenin prevents this effect entirely. Anatomically Wessely could not detect any contraction of the vessels (of the ciliary body) after suprarenin, but no derangement of its epithelium was ever to be observed after its injection. Further manometrical measurements showed that injection of suprarenin lowered the tension. The drug seems to act on the nerve terminations in the vascular walls, rather than on the ganglionic elements, for Wesseley found the results unchanged when the superior cervical ganglion had been excised from a fortnight to three months previously.

As regards the action of the drug on the pupil, the mydriasis may result from paralysis of the sphincter muscle or of its nerve endings, or from stimulation of the dilator muscle or of the sympathetic nerve endings. Wessely denies that simple vascular contraction can produce mydriasis, in the case of suprarenin at all events, for it occurs in the isolated eye of frogs and rabbits just as in the living eye.

Paralysis of the sphincter muscle may be excluded, for electrical contraction is easily induced while the eye lies in suprarenin solution. Paralysis of third nerve endings also may be excluded. as contraction to light is never completely abolished, eserine still produces contraction, and electrical stimulus of the third nerve produces prompt contraction. Irritation of the dilator remains to account for the effect of the drug. but not irritation of the nerve endings, for previous excision of the cervical ganglion does not effect the experiment. The drug, therefore, acts directly on the muscle cells or on their ganglion cells, which are probably situated in the ciliary body. The effect of suprarenin is precisely the same as that produced by Faradisation of the cervical sympathetic. and yet the drug acts not upon the nerve endings but on some other peripheral bodies, either ganglions or muscle cells.

It seems probable that no very definite paralytic hyperæmia follows the vascular contraction induced by suprarenin, and as regards the toxic effects Wessely has not observed any after injection of 1 mg. Frequent instillations produce dryness of the cornea.

Detachment of the Choroid after Cataract Operation.—E. Fuchs (Vienna). This occurrence is not so infrequent as the few cases published (eleven) would seem to indicate. Since Fuchs has paid attention to the condition he has observed five cases in the last seven months ; a sixth occurred at an earlier epoch, and he has seen three cases besides after iridectomy. The condition would be seen oftener if the cases were examined at the proper moment, viz., when some days after a successful operation the anterior chamber is found one morning abolished, and the tension reduced without the incision being open. At this period one can often find choroidal detachment, which increases for a time and then, after remaining stationary for a few days, rapidly disappears entirely. In some cases the detachment does not take place till months after operation, and it can also in these cases entirely disappear. The appearances are those described by Knapp, and in the three cases anatomically examined the detachment was produced by a transparent fluid beneath the choroid.

This typical choroidal detachment after extraction has no relation to retinal detachment. The behaviour of the anterior chamber marks a distinct difference in the two lesions, and Fuchs regards the cause in these choroidal cases to be an escape of the aqueous humour through some opening in the attachment of the ciliary body into the supra-choroidal space ; he has demonstrated such openings in eyes which were anatomically examined within a few days after cataract operations.

Choroiditis Exudativa Plastica.—F. Schiek (Halle). Two cases are recorded with five coloured plates of the ophthalmoscopic appearances, four of the plates representing the fundus of the second case at various periods. Case 1 occurred in a healthy man of 17, whose fundus, some eighteen months after the attack, exhibited extensive yellowish white exudations lying under the retinal vessels. In places the vessels entered these exudations, and on emerging were accompanied by hæmorrhages ; newly formed vessels were also present, and small aneurisms. At the beginning there was a peripheral flat detachment of the retina.

Case 2 occurred in an otherwise healthy girl of 18. One eye had long been blind from detachment of the retina, and the other had a recent partial detachment. Scleral puncture was done with excellent result, but shortly afterwards a relapse occurred, with large yellowish white masses of exudation beneath the detachment. The disease increased for a time and then gradually subsided, leaving a partial detachment with large masses lying under the retina. In both cases the tension was low, and the anterior part of the eye showed no signs of the severe internal lesions.

"*Open Wound Treatment.*"—H. Sattler (Leipzig), like the rest of the ophthalmic world, lays great stress on strict asepsis, both as regards instruments, patient, and operator. Instruments are boiled in soda solution, sterilised coats are worn, and hands disinfected as fully as possible. As regards the patient, the points on which Sattler's practice varies from that of some of the other operators who have written on the subject, are that he does not epilate the cilia beforehand, and does not keep the eye bandaged, nor does he use frequent irrigations. He merely irrigates with salt solution some hours before operating, and applies Fuchs' mask. If the sac appears normal he does not use Anel's syringe, and does not think it necessary to obliterate the canaliculi in cases of dacryocystitis. He operates in these latter cases as soon as the secretion has become merely thin transparent mucus. Since January, 1899, he has constantly treated wounds by the open method, Fuchs' mask alone being applied, with the exception of the first few hours, during which a moistened cloth is laid on the lids.

Sattler expresses himself well pleased at the results of this method of wound treatment, which he has used in 240 extractions of senile cataract as well as in numerous other operations. He urges the well-known arguments in its favour, which have been brought forward by Hjort and others; and notes that four of his patients suffered from delirium, so that darkness cannot be quite so potent a factor in the causation of post-operative delirium as is commonly asserted.

In the discussion Schwarz stated that he had adopted the open wound treatment also, using wire gauze protective spectacles. Schmidt-Rimpler uses the same apparatus.

Position of Sphincter Nucleus.— St. Bernheimer (Innsbrück) places the centre for the sphincter pupillæ in the small-celled median nucleus of the same side, which lies in the anterior third of the anterior corpus quadrigeminum under the aqueduct of Sylvius. He has now succeeded in demonstrating this in the ape by destruction of the nucleus of one side without implication of any other structure in the brain. The animal was kept alive for four weeks, during all which time the pupil of the side operated on remained dilated, with absolute loss of reaction to light, either direct or consensual, while the other pupil acted normally. Microscopic examination subsequently showed that the lesion was confined to the nucleus in question.

Divergence Paralysis.—A. Bielschowsky (Leipzig). The author reports three cases in support of the theory that a special centre exists for the action of divergence. Anatomically, of course, no such centre has been demonstrated, and authorities differ as to whether clinical evidence as to its existence is to be accepted.

Case 1. A woman of 35; diplopia for eight days. Eyes divergent, but conjugate movements normal, and convergence possible to normal near point; angle 10°, and equal in primary and secondary positions of eyes. The only marked decrease in the distance of the double images was when the gaze was raised, and there was a slight increase when the eyes were depressed. These differences are in accord with the normal effect upon the power of divergence of raising or lowering the eyes. Binocular vision existed for objects not further than 25 to 30 cm. A distant object was seen double till it reached this point, but an object could be gradually moved beyond this point to 50 cm. before diplopia recurred. Corresponding results were obtained with converging prisms. Correct accommodation was present for all distances, the parallelism between accommodation and convergence being abolished. The lesion was probably due to cerebral syphilis, and paralysis of the left abducens occurred subsequently.

Case 2. A man of 17 developed diplopia six weeks after concussion of the brain from an accident. Diplopia for all objects beyond 75 cm. distance except when the eyes were raised. Conjugate movements normal, and convergence near point also normal. Angle of divergent squint 5° to 6°, increased to 8° in extreme right side of field, and for somewhat near objects also slightly increased in extreme left of field. A prism of 3° before each eye completely corrected the defect.

Case 3. One of lead poisoning exhibited much the same symptoms, but the rapid onset of amaurosis interfered with the investigation.

Three hypotheses are possible in these cases: (1) unilateral or bilateral abducens paralysis; (2) spasm of convergence; and (3) paralysis of the supposed divergence centre.

The first hypothesis may be dismissed as untenable, and Bielschowsky considers the third more in harmony with the facts observed than the second. The lesion is distinctly of a paralytic type, if only on account of the constancy of the deviation and its low degree.

(*To be continued.*)

FURTHER NOTE ON THE PATHOLOGY OF TOXIC AMBLYOPIAS.

By J. Herbert Parsons, B.S., B.Sc.Lond.
Research Scholar of the British Medical Association.

In a "Note on the Pathology of Toxic Amblyopias,"[1] I recently drew attention to the importance of Professor Langley's work upon nicotin in its relation to the work of other observers upon toxic amblyopias. I had not intended to discuss the question further at the present stage for the following reasons. In the first place, there is no evidence to show that nicotin is the *causa causans* of tobacco amblyopia. Nicotin is one of the less volatile active principles of tobacco, and is only contained in minute quantities in tobacco smoke, or may be absent entirely. Certainly a small amount may enter the system from the foul pipes usually smoked by sufferers from the complaint, but it is questionable whether the quantity is sufficient to produce any toxic effect. The vascular effects of over-smoking rather negative such a supposition, for the impaired cardiac action is indicative of a diminished blood pressure, as opposed to the enormous rise in pressure which follows the administration of a minute dose of nicotin. The toxic effect is much more probably due to pyridin (C_5H_5N), and its derivatives, picolin ($C_5H_4(CH_3)N$), lutidin ($C_5H_3(CH_3)_2N$), collidin ($C_5H_2(CH_3)_3N$), &c., which are present in much larger quantities in the smoke. Since, however, these bodies have a somewhat similar action to nicotin, only

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less pronounced, theories deduced from the action of nicotin may still have some value. In the second place, the occurrence of a pure tobacco amblyopia is a clinical rarity. In most cases the use of tobacco is associated with the abuse of alcohol. In the third place, our knowledge of the histology of the macular region of the retina is defective. The normal mammalian fovea has not yet been submitted to the careful examination by the Golgi method, which has been applied with such noteworthy results to the rest of the retina by Ramón y Cajal.[2] This observer has shown that in birds and reptiles, the cones, bipolar cells and ganglion cells at the fovea have slight modifications which, if as is probable, they also occur in the mammalian retina, are of great interest from the present point of view. Moreover, the changes in the ganglion cells, which are shown by the Nissl method in some toxic amblyopias, have not yet been demonstrated either in tobacco amblyopia in the human subject or in nicotin poisoning in animals; and the changes which have been described have not been limited to the macula.

I should have preferred, therefore, to have awaited more accurate knowledge, derived from histological and experimental research, before further theorising upon the subject. The fact, however, that Mr. Herbert Fisher[3] has discussed the question independently from the same point of view, but with somewhat different conclusions, leads me to enter into it more minutely.

I.—ANATOMY.

(*a*) *Morphology.*—There can be no doubt that the so-called optic nerve is really a lobe of the brain. The exact morphology of the various parts of the visual conducting paths is still a matter of dispute. This is fundamentally due to the fact that the whole retina arises embryologically from the central nervous system, and not from a separate origin as do the spinal ganglia. In all probability, the true optic *nerve* is represented by the bipolar cells of the inner nuclear layer, which are thus homologous to the spinal posterior ganglion cells. The rods and cones would then be homologous to the neuro-epithelial cells of taste-buds; and the ganglion cells to the cells of the nucleus gracilis, the nucleus cuneatus or the mitral cells of the olfactory bulb, belonging thus to the central nervous system.

This view is supported by the observations of Krause,[4] which tend to show that the outer limbs of the rods and cones are really the cilia of ependymal cells coiled up. On the other hand, there is some evidence that in cephalopods the rods and cones are true peripheral nerve cells (von Lenhossék[5]). If the former view is adopted, the homology applies to all the centripetal nerves, both spinal and cranial. The explanation is more difficult by the second view; but, according to both, there is morphologically no reason to suppose that the number of cell-stations upon the visual conducting paths is different for any parts of the retina.

(*b*) *Histology*.—Ramón y Cajal's work by a modified Golgi method has shown most clearly the relationship between the various cells of the retina. The bipolar cells come into relation peripherally by vertical dendrons with several rods. The dendrons of the bipolar cells for the cones lie in a deeper plane and are horizontal, but similarly come into relation with several cones. The axons of the rod-bipolars run centrally to the inner part of the inner plexiform layer, whilst the axons of the cone-bipolars may form their arborisations at any of the five layers of the inner plexiform layer. Over the greater part of the retina there are about a hundred rods and cones to one ganglion cell, but there is no evidence to show that this involves a varying number of synapses.

Ramón y Cajal has only investigated the fovea in the bird and the chamæleon. In both there are only cones present; they are in enormous numbers and are much finer than in other parts of the retina. Their axons end in knobs without fibrils, or with only a pair of very short rudimentary fibrils. The dendrons of the cone-bipolars are also rudimentary. The ganglion cells in the central part of the bird's fovea were not stained. Peripherally, their dendrons had very small arborisations, which seemed to be in relation with a single bipolar cell, and possibly several amacrine cells.

Histologically, therefore, whilst there is good evidence to believe that at the fovea each cone has its own bipolar and ganglion cell—it remains, so to speak, "individualisirt" (Cajal)—yet in other parts of the retina no link in the chain is missing. The impulse from any rod or cone is transmitted through one or more bipolar cells to one or more ganglion cells. The function of such lateral spreading of the impulse is probably the same as that of the spongioblasts or amacrine and horizontal cells, and resembles that of association fibres in the brain. The necessity for greater individualisation of the macular region readily follows from physiological considerations, but does not involve any inherent difference in the mode of transmission of the impulse. The impulse from any rod or cone must pass through at least three nerve cells to reach the cerebrum, viz., (1) the rod or cone bipolar, or neuron of the first order; (2) the ganglion cell, or neuron of the second order; and (3) the cell of the lateral geniculate body, or pulvinar of the optic thalamus, or neuron of the third order. At least one more neuron must be inserted after the neurons of the second order whose axons go to the superior corpus quadrigeminum, since these cells are in relation with the cells of the nuclei for the extra-ocular muscles. It is therefore inconceivable, with the knowledge we possess, that the nerve impulses of the "more peripheral parts of the retina" should not pass through nerve cells *en route* for the cerebral cortex; and both morphological and histological evidence tends to show that the direct tract for the peripheral parts of the retina contains the same number of cell-stations as that for the macular region. The optic nerve fibres which can be traced "through, or apart from, the ganglionic cells to the inner molecular layer" (Foster) cannot be brought forward against this view. These fibres are the centrifugal fibres first discovered by Ramón y Cajal in 1888. He describes them thus: "One finds here (in the nerve-fibre layer in birds) sometimes single thick fibres, which spring from the optic nerve, traverse the inner plexiform layer and rise to the level of the amacrine cells. Here they break up into a terminal arborisation with thick, varicose twigs which end quite free. Since the ends of these twigs never overstep the limits of the amacrine cell layer (the spongioblasts), it is to be considered that these are *centrifugal fibres* which serve to convey any impulse from the visual centres in the brain to the amacrine cells ("dass diese *centrifugalen Fasern* dazu dienen, irgend einen Impuls von den optischen Centren im Gehirn den amakrinen Zellen zuzuführen").

II.—THE EFFECT OF NICOTIN UPON NERVE CELLS.

In a communication to the Physiological Society on March 16 of this year, I stated the results of some experiments upon the histological effects of nicotin upon nerve cells. The following is an extract from the Proceedings of the Society[6] :—

"The superior cervical ganglia of cats, which had been anæsthetised with ether, were removed immediately after death and immersed for various periods, from one to three hours, in watery or isotonic saline solutions of nicotin of

1 per cent., 2·5 per cent., or 5 per cent. strength. Sections of the ganglia were compared with sections of the normal ganglia prepared and stained in identically the same manner, viz., fixation in saturated corrosive sublimate solution, imbedding in paraffin, and staining with toluidin blue.

"After being immersed for one hour in 1 per cent. aqueous solution of nicotin—a period more than sufficient to ensure the full physiological effect of the drug—the cells are not to be distinguished from normal cells. This supports the conclusion arrived at by Langley,[7] that the action of the drug is not directly upon the cell, but upon the synapse of the pre-ganglionic fibre."

After more prolonged action, or immersion in stronger solutions various changes are brought about, which are of no importance from the point of view of toxic amblyopia.

The histological evidence is therefore against the view that nicotin has any direct action upon the cells themselves. The Nissl method, which was used in the above research, is extremely delicate, but there may yet be changes produced by the drug which it is unable to demonstrate. Indeed, there are physiological experiments which tend to show that the drug is capable of affecting the cell itself functionally; but as these form the subject of a communication which is announced by Professor Langley to the same society and which has not yet been given, I shall not refer to them further here.

The effect of the administration of nicotin to animals has been investigated by the Nissl method in the cells of the central nervous system, by Vas[8] and Pándi,[9] but the retina was not examined. Pándi describes a "sclerotic" change in the cells, which show a characteristic intense staining. The white matter also suffers, especially in the form of a system-degeneration of the posterior columns.

III.—CHANGES IN THE RETINA IN TOXIC AMBLYOPIAS.

Whilst there are no accurate records of the changes produced in the retina by nicotin poisoning, the changes brought about by quinine, extractum filicis, carbon disulphide, and methyl alcohol, form the subject of a most careful research by Birch-Hirschfeld.[10] For the details the reader is referred to the original papers. The most characteristic changes are in the bipolar and the ganglion cells. The former show a diffuse stain due to a fine granular deposit. The latter are slightly shrunken, the ground-substance being reticulated and vacuolated, whilst the nuclei may be either swollen or shrunken, the nucleoli being irregular. These changes occur throughout the retina, and are not confined to the macular region.

IV.—CONCLUSIONS.

From the facts adduced above, it does not seem to me to be possible to accept the simple theory brought forward by Mr. Herbert Fisher. Anatomically there is no reason to suppose that the macular impulses pass through more cell-stations than those from the peripheral parts of the retina. Such changes as have been demonstrated in various forms of experimental toxic amblyopia have not been limited to the macular region. There is evidence to show that chronic nicotin poisoning can produce a system-degeneration, and it is noteworthy that this degeneration is in the sensory neurons of the first order, and would therefore correspond either to the bipolar cells, or, if von Lenhossék's deductions are true for mammals, to the rod and cone cells, but in no case to the axons of the ganglion cells. The evidence is in favour of nicotin acting primarily upon the synapse and not upon the cell around which the arborisation takes place. Warrington,[11] by section of posterior roots of the cord, has shown that cutting off the afferent impulses to a nerve cell is an even more potent cause of degeneration of the Nissl granules than cutting its own axis-cylinder process. These results of Warrington await confirmation, though I have seen some of his sections and they are apparently conclusive. Still, in such a striking phenomenon, it is well to exercise caution until the results are definitely set beyond dispute. If they are true, they offer an explanation of degenerative changes both in the bipolar and in the ganglion cells, but one would rather expect a more general progressive degeneration of successive neurons of higher order. This is not the case in most nerve lesions; and there is no evidence that it occurs in toxic amblyopias, where the degeneration is confined to the papillo-macular bundles, and, so far as is known, does not extend farther into the brain.

It would seem then that we must search for some other cause for the peculiar weakness of the macular region. The special differentiation of this part of the retina, which finds its anatomical expression in an "individualisation" of the nerve elements, is, at any rate from the point of view of Herbert Spencer, a sign of greater complexity, and therewith of greater vulnerability. Without, however, having recourse to a metaphysical explanation, it may well be that the cause is to be found in the relatively poor blood-supply of the macula. Ward Holden[12] was the first to invoke the aid of vaso-constriction in the pathogenesis of a toxic amblyopia, viz., quinine amblyopia. Nicotin is an enormously more powerful drug in this respect than quinine, but there are many difficulties in the way of definitely accepting this explanation. It should only be regarded as a tentative working-hypothesis, to be put to the test of experiment. It is in this sense, and in this sense alone, that I consider that the action of nicotin (or, rather, of the unknown cause of tobacco-amblyopia) may be supposed to be two-fold: (1) vascular, causing vaso-constriction of the arterioles, which would explain the selection of the sparsely-supplied macular region; (2) paralytic, upon the synapses either of the cone-fibres, or of the cone-bipolars, or of both.

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REVIEWS.

ALEXANDER BRUCE (Edinburgh). Paralysis of the Vertical Movements of the Eyes. *Transactions of the Edinburgh Medico-Chirurgical Society, vol. xix.*

While paralysis, temporary or more permanent, of lateral movement, is common enough, as well as spasmodic conjugate deviation, paralysis of the upward and downward movements is, on the contrary, very rare. Bruce records a case in which this condition was observed during life, and the lesion demonstrated *post mortem*. It was that of a woman aged 46, who had been complaining, ever since exposure to a snow-storm three months previously, of pain and deafness in the left ear following upon a rigor ; besides that, there had been slight headache, not at all severe, no vomiting, but a general feeling of malaise. It transpired also that seven years previously she had fallen from a chair and struck her head violently. There was no alcoholic or syphilitic complication in the case. There was no inco-ordination whatever of the movements of the upper extremities, but there was a very marked tendency to fall backwards whenever she shut the eyes and stood erect. So strong was this tendency that when she was placed seated in a chair and caused to lean forwards she could maintain this attitude only so long as she was allowed to place her hands on her knees. So soon as these were removed, even if her attitude was such as to have caused danger of falling forwards, she at once straightened herself and fell backwards. There was no disposition whatever to fall to either side. Involuntary and unconscious urination was apt to occur. Leaving aside other points in the examination more foreign to the present consideration, we turn to the condition of the eyes.

The palpebral fissures were fairly wide open and equal in size ; the act of winking was performed quite well ; there was absolutely no ptosis, nor was there any till the day of her death, about a month after she was admitted to the Royal Infirmary. When the patient was encouraged to look upwards there was no movement whatever of the eyes or eyelids—the power of upward movement was entirely gone. Downward movement was imperfectly performed, but was not impossible. Lateral conjugate movement was perfectly and readily performed. The power of convergence became very weak within a short time of her admission, though it was normal on the first examination. No nystagmus was present. The ophthalmoscope showed slight obscuration of the margins of both discs ; the veins in the fundus appeared very large ; these changes were more marked in the left eye. As the case went on hebetude increased with occasional delusions, cerebral vomiting occurred at times ; a slight tendency to turn the head to the left was noticed, and the temperature, which had hitherto been normal or subnormal, ran up to 102°, and the pulse from 75 to 170; respiration was also much quickened. The *post-mortem* examination revealed a tumour "extending from a point midway between the two corpora quadrigemina, as high as the third ventricle, into the posterior part of which it projected like half a bean." On microscopic investigation this proved to be a highly vascular glioma growing from the grey matter round the aqueduct of Sylvius. "At the level of the upper part of the third nucleus the tumour had infiltrated practically the whole of the Sylvian grey matter, and had surrounded the cells of the oculo-motor nucleus. The lower part of the nucleus, however, was not so completely involved by the infiltration, and the fourth nucleus had escaped entirely. The pons, sixth nucleus, and cerebellum were quite normal. A second pea-sized glioma was found on the right side of the septum lucidum, projecting into the lateral ventricle. Both lateral ventricles were somewhat distended with a clear fluid." Bruce attributed the gradually increasing blindness and hebetude, the further interference with the ocular movements, and the final coma, to blocking of the aqueduct of Sylvius, and a consequent hindrance to the escape of cerebro-spinal fluid from the ventricles. The eye symptoms were almost certainly due to the gradual downward growth of the neoplasm, and the order in which failure occurred seems to suggest that the elevators of the globe occupy a higher position than the depressors, an additional confirmation of what we believe, on other grounds, to be the state of the case. The tendency to fall backwards is probably to be attributed to the pressure exerted by the tumour upon the walls of the third ventricle.

Such cases are very rare. Gowers described one in which "a very small tumour was found in the middle line behind the posterior quadrigeminal bodies, damaging these slightly, the velum, and the adjacent part of the inferior vermiform process of the cerebellum." Wernicke published a case, in which, however, ptosis was also a feature, with a tumour in the optic thalamus and corpus striatum; that of Lang and Fitzgerald was somewhat similar. Experimental lesions of the middle lobe of the cerebellum may produce excitation or paralysis of vertical movements, and destruction of the posterior part of the median lobe a tendency to fall backwards, which suggested to Bruce that the lesion in his case might be found farther back than turned out to be the actual fact. The case is probably unique and is so full of interest for the ophthalmic surgeon and the neurologist, that Bruce's accurate clinical description and careful *post-mortem* records become very valuable.

W. G. S.

LEVINSOHN (Berlin). Ophthalmoplegia Interna.
Archives of Ophthalmology, March, 1901.

After describing two cases with which he had recently met, and which, contrary to what is the usual rule, occurred in each instance in a young subject, the author proceeds to give an interesting review of the present state of our knowledge of the nerve relations of the internal musculature of the eye in general, and more especially of the pupil. Some time ago Uhthoff collected thirty cases of ophthalmoplegia interna, in twelve of which, as in the two cases just referred to, no cause for the condition could be discovered. All of these twelve were comparatively young persons and had a "neuropathic disposition," and in most of them the symptoms were of very short duration; in one case, however, a woman had had the condition without any other nervous complications whatever for twenty-two years. He thought that in a number of those "causeless" paralyses some noxious agent—probably ptomaines from meat or fish which had a special affinity for those nuclei—must be at the root of the mischief.

Levinsohn argues that in long-standing paralysis of the internal musculature the lesion must necessarily be nuclear, and not peripheral to the ciliary ganglion, inasmuch as eserine produces ready contraction both of pupil and ciliary muscle—such, at least, was true of the two cases in question, if not of all. Since the pupil reaction to light is in certain cases affected unequally with that to convergence, it is difficult to see how the ciliary ganglion could be the seat of the lesion. This was, as everyone knows, the original explanation of the condition before the facts were so fully known as they are now, and the theory has recently been defended anew. A lesion of the nucleus meets the difficulties precisely. In one of his cases, however, Levinsohn found slight weakness of accommodation, and in one eye a pupil contracting along with convergence, but not to light—a condition of unilateral reflex iridoplegia, in other words. In Levinsohn's opinion, this condition of reflex unilateral iridoplegia may perhaps not be so very rare, but it presents some interesting problems, and it complicates considerably the question of the locality of the lesion in Argyll-Robertson pupil. No pathological report on any case of it which came to *post-mortem* examination is to be found.

The two sphincter nuclei are, as has been shown, doubly connected, for there is not merely an incomplete crossing of the pupillary fibres, but there is also a directly connecting band. If this be so, then it is obvious that unilateral reflex iridoplegia cannot be due, as was at one time suggested, to a lesion of the centripetal reflex branches, since the stimuli conveyed from the other nerve would be carried to both sides, and contraction of both pupils would occur. Heddaeus at one time propounded a theory that the sphincter fibres might have a double origin, in the true sphincter nucleus proper and in the accommodation nucleus, each of which had influence only in its particular function. One very serious objection to this theory is that in any case of unilateral iridoplegia the pupil immobile to light must necessarily be the larger of the two, which is not the fact. Levinsohn agrees with Heddaeus that such a condition can depend only on a lesion at the point of departure of the centrifugal reflex branch, and postulates that there must be two sets of cells in the nucleus, one set to which, for the sake of convenience, he applies the name SL, whose function it is to transform the excitation conveyed by light into movement of the sphincter, and the other, named SC, whose function is to permit or assist in the transformation of other stimuli into contraction of the pupil. This theory is not unlike that mentioned above, but while each will explain the dilatation of the pupil which is usual along with iridoplegia, we do not require, as in the first theory, to postulate an irritation of the accommodation nucleus, for which there is certainly no evidence whatever, and which is to a high degree improbable, in order to explain the cases in which there is not mydriasis but myosis; we have only to assume, which is likely enough, an irritation of SC along with the abrogation of the function of SL.

Levinsohn points out, too, that we ought not to be in the habit of regarding those oculomotor fibres which proceed from the sphincter nucleus as motor in the ordinary sense of the word. They are part of the reflex nervous mechanism which conveys impulses to the ciliary ganglion, but it is in the ganglion that the neurons lie whose function it is to excite the contracting fibres.

The view just propounded allows us to understand the Argyll-Robertson pupil readily enough, because not only will it account for the cases in which the pupils are at the same time equal and small, but those also in which they are unequal, irregular and dilated, and those again in which the pupil reaction is less in degree on one side than in the other eye. Such conditions practically demand that the lesion shall be at "the point of departure of the centrifugal reflex tract," a phrase for which the reviewer suggests the briefer expression, "the delivery centre." It explains, too, how as the disease advances a reflex iridoplegia may gradually pass over into an absolute iridoplegia, and on the other hand how, under certain other conditions, the contrary takes place while recovery is in progress. These are further reasons for locating the cause of the reflex iridoplegia in the sphincter nucleus.

It is interesting to read along with this the valuable paper by Harris on the Argyll-Robertson pupil, reviewed in this journal (1900, p. 340), in which the author arrives at a distinctly different conclusion.

W. G. S.

MAILLART AND WIKI (Geneva). Two Cases of Unilateral Nuclear Ophthalmoplegia. *Annales d'Oculistique, May*, 1901.

The two authors first relate their cases, of which we reproduce the essentials, and then discuss their signification.

Case 1 was that of woman aged 30, a sister of whose had died of meningitis at the age of 20; but in other respects her family history was quite unimportant. Before her marriage there had been no visual or auditory troubles, and her husband, whose family history was also good, denied any previous syphilitic infection, nor did he present any signs of such. The first pregnancy had resulted in a miscarriage at the seventh month for no ostensible reason; at the next, the child showed, during its early weeks, ulcerations about the mouth, and eruptions on feet and legs which were treated by means of mercurial ointment; the boy died at three months. At this time the patient suffered much from headache, but showed no other manifestations which could be supposed to be syphilitic. The third child was born quite healthy, and recovered completely from an attack of diarrhœa with skin eruption at about six weeks. During pregnancy the patient complained of dulness of hearing and of noises in the ears. About six months later she was much distressed by headache, especially nocturnal, with pain chiefly located round the left eye. A little later she became distinctly somnolent, and an inability to open that eye completely was noted; then followed diplopia and intense headaches, ptosis became complete, and the left eye entirely immovable. On examination, no abnormality of sensation in that region was to be discovered, but the pains all round the left eye, especially during the night, were intense. The motions of the right eye were perfectly normal, and there was no tendency for the head to be inclined to the right shoulder when looking at an object. In the left eye all lateral movement was lost, but the vertical movements not quite completely. On an attempt to look down, the action of the superior oblique was quite evident. The pupils were equal and acted well to light and accommodation; accommodation itself was equally well performed in the two eyes. Movements of face, tongue, and limbs were perfect; patellar reflexes and action of sphincters normal; there was marked interference with hearing, and complaint of noises in the ears. The child was well nourished and heavy for its age, but there was a discrete coppery eruption all over the body, and a large head with a high forehead. No teeth had as yet appeared (7½ months). Under iodide and mercurial ointment the condition of the mother improved so quickly that in three weeks symptoms were almost completely gone.

Case 2 was that of a man aged 28, who had had a hard chancre ten years ago, followed by definite secondaries. Four years ago he married, but his wife has never become pregnant. He had never complained of anything being amiss with his sight until the day after being drafted into barracks a few months ago, when he awoke to find that his left eye was blind and could not be opened spontaneously. There was no somnolence nor vertigo; severe pains round the left orbit were complained of, arising at the same time as the loss of power over the eye. The right eye was perfectly normal in vision and mobility, and the patient did not incline the head to either shoulder. In the left eye there was complete ptosis, and all movements of the globe were abolished. The pupils were equal, the accommodation reflex was much enfeebled on the left side, but the light reflex was well preserved. Vision was hazy and accommodation impossible. The ophthalmoscope showed nothing abnormal. Movements of face, tongue, and limbs were all perfect, and there was no interference with hearing. Under mercurials, iodide of potassium and faradisation, improvement followed, but not very rapidly; accommodation in particular was very little better up to the date of writing.

The first of these cases, then, is one of complete unilateral (left) ophthalmoplegia externa, the other is one of incomplete unilateral (left) ophthalmoplegia, since in it accommodation was paralysed, but the iris remained intact. As regards the seat of the lesion, it is manifest that it could not be "above" the nuclei, either in the cortex or in the connecting fibres between the two, for lesions in such a situation paralyse associated movements rather than individual muscles; the seat of the lesion must be in the nuclei or the nerves proceeding from them to the muscles. In a number of such cases on record there were other contingent circumstances pointing to a nuclear lesion, such as bulbar paralysis, for example, and probably some may have been caused by neuritis of the nerve roots.

On the other hand, when one enquires into the causes credited with producing the lesions in such cases, syphilis is that most usually mentioned, and tabes, alcohol, lead, diphtheria, and zona are chiefly referred to—all of these being conditions which are much more given to attacking nerve paths than nerve cells. Nor is it readily explicable that a lesion should attack nuclei which lie at some distance apart from one another, and spare those which lie close at hand. Thus, taking it for granted that Kahler and Pick's scheme of the positions of the various nuclei is correct, it will be seen that in the second case the nucleus lying most anterior, namely, that of the ciliary muscle, was paralysed, while that of the sphincter iridis, which lies next to it, was spared, and those lying further back were again deeply affected. The authors appear to accept without reserve the assertion that the nucleus of the right fourth nerve is practically continuous with those of the left third, and to found these views partly thereon, and on the rotation of the head about an antero-posterior axis which "ought" to take place in order to counteract the faulty projection produced by such paralysis; but this foundation seems to the reviewer to be hardly sufficiently stable to bear the superstructure, which for other reasons besides seems to him to be lacking in security; he does not agree with the opinion of the authors as to the pathology.

If on the other hand one adopts a theory of neuritis, he is at once met with the same difficulty, viz., that certain fibres are attacked while others are spared; but in this case the difficulty is not so great, for we know that many poisons have their nerves, and even their special fibres, of election: lead, for example. In the cases which have proved fatal and in which examination of the nuclei has been made, the lesions found in the nuclei have been such that it seemed impossible that recovery could possibly take place, while on the other hand we know from other circumstances that recovery from very grave injury to nerves can take place perfectly. Some observers, too, have found the nuclei quite sound, and some have been able to prove a pathological condition of the nerve trunks. In these two cases the improvement under the iodide and mercury was very marked.

W. G. S.

BALLENGER AND WIPPERN. Diseases of the Eye, Ear, Nose and Throat. *London: Henry Kimpton.*

It has been thought to be advantageous that in one book a reader should be able to find what he wishes to know in reference to both the eye, ear, nose and throat, and accordingly the authors have compiled this book together, the portion dealing with the eye being from the pen of Dr. Wippern, of Chicago. We do not feel confident that the marriage has been a happy one, for all through the section of the book with which we have more particularly to do one cannot help the feeling that there has been a constant attempt to save space at the expense of completeness. The book makes no pretence to be a real text-book, though it is fairly good so far as it goes; the barren facts supplied are in general accurate enough, but there is nothing stimulating in the study of what is really the dry bones of all such works. The author very unnecessarily betrays here and there abysmal ignorance of the essential differences in structure between Latin and Greek, a deficiency in which, however, he is not singular.

MARTINDALE AND WESTCOTT. The Extra Pharmacopœia. *London: H. K. Lewis.*

We have received a copy of the fourth edition of the familiar "Martindale and Westcott," the latest development of an old familiar friend. There is now quite a formidable list of new local anæsthetics more or less suitable for eye work, most of them in our experience rather less than more, and of mydriatics not a few. There is no need to say that the information is thoroughly up to date, for that is a matter of course. The Extra Pharmacopœia is not a book with which to adorn a shelf, it is a necessity of one's business table; praise of a thing which one cannot do without is thrown away.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

JUNE 13, 1901.

Mr. G. ANDERSON CRITCHETT, F.R.C.S.E., in the Chair.

Paralysis of the Third Nerve with unusual Complications.—Mr. Mules read this paper. The patient was a man of 75, accustomed to treat his own ailments. Before Mr. Mules was sent for the patient had been applying some more than usually heroic remedies to the scalp, with the result that the whole scalp and eyelids became œdematous with numerous sloughs. There was also paralysis of the third nerve on one side as far as the external muscles were concerned. The original malady was probably herpes of the fifth nerve, and the author was confirmed in this opinion by the occurrence within the next few weeks of a sort of epidemic of herpes. He enquired whether other members had come across similar instances of herpes associated with paralysis of the third nerve.

Mr. Marshall referred to the work of Drs. Head and Campbell, recently published in *Brain* (*v.* OPHTHALMIC REVIEW for April), on the pathology of herpes.

Mr. Mules said that he had read it, but did not find any explanation of the point that he had raised.

Dr. Aldren Turner mentioned the not unknown sequence of Bell's palsy after herpes of the superficial cervical plexus, and of the paralysis of muscles following herpes of an ordinary mixed nerve, such as the sciatic.

Mr. Marcus Gunn asked if there had been any injury previous to the illness. He himself recalled two cases bearing on the point. In one, after a severe head injury involving concussion of the brain, the third nerve was paralysed, and shortly afterwards an attack of herpes occurred. In the second case the cutting down on the supra-orbital nerve for the relief of neuralgia was followed by paralysis of the third.

In reply to the President, Mr. Mules stated that in his case the herpes did not affect the eye itself.

Double Symmetrical Opacities of the Cornea (*rare form*) *removed by Operation.*—Mr. Mules recorded a case of brown opacities symmetrically placed in each cornea, and slowly progressive for eight years, in a patient of 70. These were triangular in shape with the apices towards the pupils, and on their reaching the centre, relief by operation became necessary. In the first eye he tried scraping, but the operation was difficult and tedious, taking half an hour to perform. In the second eye he used a narrow sclerotomy knife inserted between the layers of the cornea and cut off the opaque part with rapidity and ease, leaving a faceted but transparent surface. The situation of these opacities was not superficial but interstitial, and he attributed them to a local stasis of the fluid normally circulating between the corneal layers.

The President mentioned a similar case which he had watched for seven years. He agreed as to the situation of the opacity being interstitial.

Cyclitis: a Study of Inflammatory Exudates into the Vitreous Body.—Dr. Leslie Buchanan, by means of lantern slides, demonstrated some important points in the pathology of cyclitis. The exudation was first found on the surface of the smooth portion of the ciliary body. From here it spread both forwards to the folded portion and backwards to the retina. From without inwards, the exudation could be divided into three layers ; (1) a fibrous zone ; (2) a fibrinous zone : and (3) a fibrino-cellular zone. The cells that formed the exudation were not all formed from the endothelium, but might be seen in bleached specimens migrating from the deeper layers of the ciliary body. The various changes which the cells undergo were then described. Ultimately by contraction of the fibrous layer the eye became contracted and distorted. In many cases true bone was formed out of the fibrous layer.

Erythropsia.—Dr. W. H. A. Rivers discussed the causation of this condition, both when it occurs normally after exposure to a bright light as a red border to a white object ("Bidwell's phenomenon"), and when it occurs clinically after extraction of the lens. The theory that the visual purple has anything to do with it was rejected on the ground that it must be due to something not in but internal to the percipient layer of the retina. Internal reflection from the lateral walls of the fundus might account for it in some cases, but not when lateral light was excluded. The explanation that the author favoured was that the blood in the anterior layers of the retina had something to do with it, though it was true that the phenomenon existed at the macula which had no blood vessel in front of it.

Mr. Swanzy thought that there was still another form of erythropsia which he had himself experienced. On sitting down to examine a patient by the light of a good duplex lamp, he had adjusted the wick, watching the flame meanwhile. On now looking at the patient's eye, he was alarmed at what he thought was a hæmorrhage in the anterior chamber. After shutting his eyes for a few moments the phenomena disappeared. Similarly he had found immediately after looking at an incandescent gas mantle that the black letters of a book looked red.

Dr. Edridge-Green said that it was most difficult to get a positive after-image with red, and most easy with green light. This told strongly against the view that blood was the cause of erythropsia.

Dr. Rivers, in reply, said that the phenomena of after-images, of which Mr. Swanzy's was one, were altogether distinct from erythropsia.

Note on a Streptothrix Mass (? Actinomycosis) removed from the Right Inferior Canaliculus.—Mr. G. Mackay. The point about this case was its diagnosis from the more ordinary leptothrix. Photographs from microscopic slides showed filaments branching at the end with bulbous enlargements at some of the extremities. A section under a high power of one of these enlargements showed the structure of the Ray fungus.

The following cases and card specimens were also shown :—

Thiersch Graft in a Case of Xerosis of the Conjunctiva.—Mr. Arnold Lawson.

Drawing and Microscopical Sections of Carcinomatous Tumour of the Corneo-scleral Margin.—Dr. Leslie Buchanan.

Nævoid Condition of the Retina.—Mr. H. Work Dodd.

Nævoid Condition of the Vessels of the Disc with Nævi of the Eyelids and Face.—Mr. Hartridge.

Case of (?) *Sympathetic Ophthalmia occurring nearly ten years after Enucleation of the Injured Eye.*—Mr. J. Hern.

Growth of Conjunctiva in an Old Man, for Diagnosis.—Dr. A. Brunner.

An Apparatus for Vibration-massage of the Eye.—Dr. A. A. Hudson.

A New Eye Speculum.—Major H. E. Drake-Brockman.

Sub-retinal Cystic Swelling at centre of Fundus.—Mr. J. H. Fisher.

Tubercle of the Iris.—Mr. Inglis Taylor.

Congenital Fibro-vascular Tumour removed from the Eye.—Mr. Richardson Cross.

Double Coloboma of the Lens.—Mr. Morton.

Hole in the Retina.—Mr. Doyen.

TRANSACTIONS OF THE HEIDELBERG OPHTHALMOLOGICAL SOCIETY.

(*Continued from p.* 180.)

Bimacular Vision.—L. Heine (Breslau). By this the author understands the highest form of so-called binocular vision. A man may have binocular vision so far that prisms produce diplopia, and movements are made to correct it, and yet be unable to fuse stereoscopic images. A man may even experience a certain struggle between the visual fields when different objects are presented to the two eyes, and yet have very imperfect bimacular vision in the strict sense of the term. The highest form of binocular vision shows itself in Hering's experiment with the falling balls, or with the three rods test. In the latter three small rods are placed at 5 m. distance, their upper and lower ends hidden. Perfect binocular sight can always detect if the middle rod is moved either towards the observer or away from him. Most minute movements are perceived, corresponding to an angle of five to six seconds. Heine argues from the observations that we must assume a double nervous supply to the macula, viz., a supply from both sides of the brain. Diagrams were presented in support of the argument, for the details of which the original should be consulted.

The Limits of Visual Acuity.—F. Best (Giessen). The paper deals with the subject from the standpoint of physiological optics, and must be consulted in the original.

Visibility of Schlemm's Canal.—E. Fuchs (Vienna) states that in young people this canal can be observed by oblique illumination, being indicated by a faint dark irregular line around the corneal margin.

Central Acuity and Peripheral Illumination. — Ed. Hummelsheim (Bonn). The influence of the brightness of the peripheral field of vision upon central acuity is of practical importance, inasmuch as it must determine the value of visual tests made in more or less darkened rooms by local illumination of the test type. The results of the author's observations on his own right eye are exposed in two tables. Briefly he finds that an increase of illumination of the periphery of the field produces a higher central acuity of vision. His explanation of the phenomenon is, that any stimulation of the retina acts not locally alone, but also affects the function of the remaining portions of the membrane, so that a greater sensitiveness to luminous impressions results. Purely local illumination of the test type, therefore, cannot give as high figures for visual acuity as diffused illumination.

In the discussion Schmidt-Rimpler corroborated the observations, and stated that he (in common with Hummelsheim, and in contradiction to Uhthoff), had found that the condition of the pupil had no influence upon the results obtained.

The Visual Field of "Fatigue."—A. v. Reuss (Vienna). The type of field described by Foerster as occurring in "anæsthesia retinæ" (hysteria) and subsequently investigated by Wilbrand and Koenig, is the fatigue field of v. Reuss. His method of testing is to take the field in the usual way from the periphery towards the centre, and then to repeat the test round in the same direction till he reaches a constant field. If the various points are then united by a line, a spiral is found, which he regards as the typical field of "fatigue." These spirals are more satisfactory and easily obtained if the test object be blue, than if white is used.

In the discussion Fuchs remarked that he had observed in a neurasthenic, and also in a hysterical patient, that an inverse spiral was present, the field at first being about 20° in each meridian, and then enlarging spirally to almost the normal limits.

The Retinal Vessels in Arterio-sclerosis.—E. Hertel (Jena). With the object of ascertaining the changes, if any, which precede actual defects of sight in cases of arterio-sclerosis, Hertel has examined many cases, of whom fourteen died while still possessing normal vision and normal fundi. Of these fourteen he has examined seventeen eyes microscopically. In some of them slight changes, tortuosity, and perivascular thickenings were present before death.

The changes found *post-mortem* were of two kinds. The first was found in all the eyes and all along the vessels. It is regarded by Hertel as a senile change, and consists in a widening of the lumen of the vessels, with an increase of the thickness of their walls, the endothelium remaining smooth. The second kind of change was not general, and consisted in a more or less marked inflammatory lesion, viz., round cell infiltration, with formation of cellular connective tissue, leading to thickening of the vascular walls. Increase of elastic fibres in all parts of the wall was present, a condition which also is found in the purely senile changes. The increased elastic fibres sometimes projected into the lumen of the vessel; this more frequently in the arteries than in the veins. The changes are then distinctly tissue proliferation of a chronic inflammatory nature, doubtless induced by such irritants as alcohol, lead, gout, &c. It is evident from Hertel's observations that serious changes are present in the retinal vessels of persons with arterio-sclerosis long before the occurrence of defects of sight.

Intraocular Disinfection.—W. Mayweg (Hagen). The disinfection practised by Mayweg is that recommended by Haab at the Utrecht Congress, viz., insertion of iodoform into the anterior chamber. This he has been doing in cases of traumatic iridocyclitis with good results. The treatment is not a certain specific against the occurrence of sympathetic ophthalmitis, as it succeeded in only two-thirds of the cases.

In the discussion Haab stated that in two cases he had found it necessary to enucleate in spite of this treatment.

Mayweg added that he had good results from the treatment also in cases of suppurative inflammation.

Histology of the Lachrymal Gland.—Th. Axenfeld (Rostock) and Bietti (Turin). Recent observers have found in lachrymal glands excised for epiphora a fatty degeneration of the epithelium, and the operation has been justified on the supposition that the organ removed was a diseased one. Axenfeld's observations on fourteen excised glands establish a certain but unimportant increase of interstitial tissue, which is decidedly not inflammatory, and which increases with age; also some follicular cell collections, which are found too in perfectly normal glands. As regards the epithelium, however, abundant fat deposit can always be found if looked for; but this is not evidence of fatty degeneration, for the nuclei of cells with fuchsinophile granules are found perfectly normal, and the other cells contain fat as well.

Five glands from persons who died without any lachrymal troubles were also examined, and fat found in all of them. From his observations Axenfeld concludes that fat is present in the actively secreting cells, and is, in fact, an indication of the activity of the secreting cell.

These observations render it probable that the presence of fat in glands other than the lachrymal is not always to be regarded, as it so commonly is, as evidence of degenerative changes.

Passage of Iron Splinter through the Eyeball.—A. Wagenmann (Jena). The author records three cases, two of the eyes being exhibited at the meeting. In the first the splinter was found fixed on the outside of the globe close to the nerve entrance. In the second amaurosis was present, and the splinter was found to have passed out through the porus opticus, and to be partly imbedded in the nerve sheath. The third eye had not been enucleated, but the scar of the exit wound was visible close to the optic disc.

DEMONSTRATIONS.

In addition to the demonstration of specimens, &c., illustrating the papers reported above, the following exhibitions were made:—

Hydrophthalmos and Myopia.—Heine (Breslau). The hydrophthalmos which has usually been brought into relation with myopia by those who hold this theory, is the congenital variety. Heine exhibited preparations and photographs of both congenital and acquired hydrophthalmos which showed that, so far as the former is concerned, it arises from a distension of the anterior portion of the globe, while myopia arises from a defect which is principally located in the posterior region of the sclerotic. From this he concludes that myopia can hardly be regarded as a glaucomatous process.

Similar differences are found by him in the congenital hydrophthalmos as compared with myopia, but the material at his disposal was too small to enable him to draw definite conclusions as to the difference between the two forms of hydrophthalmos.

An Electric Skiascope.—Hugo Wolff (Berlin) claims the following among other advantages for the instrument: the illuminant is linear, and always lies perpendicular to the meridian examined; the edges of the shadow are therefore right lines.

Bilateral Congenital Exophthalmos with Intraocular Hæmorrhages. — The exophthalmos was caused by extensive orbital hæmorrhages, and blood was found also in anterior and posterior chambers, in the ciliary body and iris, and in the zonula and suprachoroidal space. In the second eye these parts were free, but there were numerous retinal hæmorrhages. The blood effusion was due to asphyxia only, as no instruments were employed, and v. Hippel remarks that blood effusion in the anterior part of the globe must not be attributed to injuries received at birth as has been done by Winterseiner.

Congenital Corectopia.—E. v. Hippel. The iris was completely absent in the lower nasal quadrant, and in this region a pigmentary deposit lay on the posterior surface of the cornea, and the iris was adherent to the cornea close to the border of the eccentric pupil.

Preparations of Sympathetic Opthalmitis.—O. Schirmer (Greifswald). The sympathising eye comes rarely under microscopic examination, so that Schirmer's case is interesting, inasmuch as he had the opportunity of examining the two eyes, exciting and sympathising, shortly after the onset of the disease. The conditions were alike in both eyes. Extreme cellular infiltration of the whole uveal tract with mononuclear round cells, a few epithelioid, and numerous giant cells. There was organised exudation on iris and ciliary body, cell proliferation round the central vessels in the intravaginal space, and among the bundles of the optic nerve, among which were also giant cells. Schirmer rejects the hypothesis of tuberculosis to account for the lesions, because the typical tubercular structure was absent, bacilli could not be found, nor did tuberculosis result in inoculated rabbits. Microscopically, by Busse's staining for saccharomycetes, small round bodies were found in the globes and nerves (but not in the rabbit's eye). Culture experiments with these were unsuccessful.

Crystal Pearls in the Lens.—Axenfeld (Rostock). The "pearls" were observed in the opaque portion of a zonular cataract, and appear to be identical with the "Drusen" described by Baas in a cataractous lens. Axenfeld has not yet investigated their chemistry.

Hæmorrhagic Detachment of Retina Spontaneously Cured.—Axenfeld and Yamashita (Tokio). The preparations showed absolutely no sign of the supposed choroiditis adhæsiva which has been so often assumed to be present in cases of cured detachment. There had been merely a simple absorption of the blood with atrophy of portions of the retinal and choroidal layers.

Sympathetic Ophthalmitis.—K. Grunert (Tübingen) exhibited microscopic preparations from an eye removed some five years after the onset of sympathetic ophthalmitis. The eye suffered from acute iridocyclitis, hypopyon, glaucoma, and amaurosis. No micro-organisms could be demonstrated either anatomically or by the most delicate culture experiments.

Melanotic Sarcoma of the Choroid.—E. Fuchs (Vienna). It was found in an eye which had suffered from diabetic retinitis, and originated in the layer of the large blood vessels close to the vascular wall. The neoplasm arose, not from it, but from the cellular elements.

Changes in the Aqueous in Naphthalin Cataract.—A. Peters (Bonn). Alterations in the salt percentage of the aqueous were measured by its resistance to the electric current. The author's observations show that an increase of the salts in the aqueous results from exhibition of naphthalin even before cataract is observed, and disappears after the use of the drug is discontinued.

Peters would then explain the production of the cataract by assuming that osmotic action between the aqueous chamber and lens alters or destroys the normal nutritive current of the lens, besides causing changes in the total volume of the contents of lens capsule, thus producing functional alterations in the epithelium and hastening nuclear sclerosis.

Whether all these changes are to be attributed ultimately to lesions of the ciliary epithelium, which have been observed in naphthalin cataract, in the cataract produced by ligation of venæ vorticosæ, and in that produced by lightning, is not proved. Peters observes that in human senile cataract, changes in this epithelium have been noted, and that in diabetic cataract, which so much resembles naphthalin cataract, Kamocki has found analogous lesions in the ciliary epithelium.

Blocking of the Central Artery by Endarteritis with Calcification.—O. Haab (Zürich). Of late many observers have been regarding the cases which formerly were looked upon as embolism of the central artery, as really cases of thrombosis with endarteritis. Haab, one of the chief men of this school, exhibited a series of sections from a case in support of his views. The obstruction was situated close behind the lamina cribrosa, which is the most common locality for these thrombi.

Conus downwards and Coloboma of the Optic Nerve.—Elschnig (Vienna) regards the conus downwards as the result of an ektasia of the lower wall of the globe caused by defective development of all the tunics. The situation of the defect places it in relation to the fœtal cleft, but the absence of the peculiar developmental anomalies which are found in the cases of coloboma renders it uncertain that there is a direct causal nexus between the two conditions.

J. B. S.

CLINICAL NOTES.

The Eye of the Infant.—Out of 112 new-born infants examined by de Vries (Amsterdam), 1 had a myopia of 4 D., and four others had a less degree; 11 were emmetropic, and 49 had hypermetropia of 4 D. or less; 13 had higher degrees of hypermetropia. Since the antero-posterior diameter of the infant eye is so much less than that of the adult (17 mm. as compared with 24), while the radius of the corneal curvature is scarcely appreciably less, there would necessarily exist a high degree of hypermetropia were it not for the extreme convexity of the lens which is present in the child. Panau (Nancy) finds hæmorrhages in the fundus to be far from infrequent in the new-born, a fact which is attributable to the venous stasis and increase of intra-cranial pressure during the process of birth. The existence of these hæmorrhages seemed to be really of little moment pathologically, and they are present not merely in abnormal cases, but in natural labours also, and seem to depend chiefly upon the duration of the process. They disappeared spontaneously and completely.—*Annales d'Oculistique*, February, 1901; *Rev. Gen. d'Ophtalmologie*, January, 1901.

RESTRICTION OF THE FIELD AS AN EARLY SYMPTOM IN SYMPATHETIC OPHTHALMIA.—It is of course of vast importance to be able to recognise the very earliest signs of threatened sympathetic ophthalmia, and Fergus (Glasgow) suggests that in certain cases we may be able to obtain a useful indication by examination of the field of vision; he thinks it possible also, though he has not as yet worked out his idea, that investigation of the minimum light sense may still further assist. He plainly says he is not yet at all events in a position to say whether the field can give any information; and in the cases which he records the restriction of the field was not noticed till after other symptoms had arisen, but it certainly is a point worthy of attention that after obvious changes in the disc, &c., were seen, there was restriction of the field, and it is therefore well worth consideration whether in any doubtful case a perimetric alteration, if found, would not be of great service in enabling one to decide upon the best treatment. In view of compensation questions, too, any early and reliable sign of danger would be of much value.—*British Medical Journal*, October 13, 1900.

HYSTERICAL EYE AFFECTIONS.—As a powerful means of employing the "suggestion" treatment in such cases, Berry recommends the injection, under the skin of the forehead, of distilled water, coupled with an expression of complete confidence that the condition is entirely curable. He relates cases in which ptosis, blepharospasm, amblyopia, and persistent conjunctivitis, all of hysterical origin, were cured by this means.—*Edinburgh Hospital Reports*, vol. vi.

SPONTANEOUS CURE OF CATARACT.—From time to time cases of this rare occurrence are reported, and probably more might occur were it worth while for patients to wait on and refrain from treatment, in the hope of spontaneous absorption taking place. Gifford (Omaha) has seen five cases of this condition, in four of which, however, glaucoma spoiled what might have been a good result; and he is disposed to regard glaucoma as a not unlikely effect of the processes which led to spontaneous absorption of the lens. He thinks that the lens if dislocated downwards (one method of spontaneous "cure"), or the nucleus of the lens whose cortex has become liquefied and absorbed, being thus allowed to fall down, will tend to bring about hyperæmia of the ciliary tissues by mechanical irritation, and subsequently glaucoma will follow. In two of the cases, which he had seen in early stages, there was then no sign of glaucoma.—*American Journal of Ophthalmology*, October, 1900, St. Louis, Mo.

NEURITIS AND NASO-PHARYNGEAL ADENOIDS.—It is apparently quite possible for adenoid vegetations of the naso-pharynx so to interfere with the vascular system of the orbit as, at all events in certain individuals, to become a material factor in the production of optic neuritis. Professor Königshöfer (Stuttgart) relates an interesting case in point: it was that of a young lady aged 21, whose parents had both died of respiratory diseases, who suffered from an acute neuritis of the retrobulbar type in the right eye. There was marked change in the disc, the edges obscured, the nerve head swollen. The fields of vision were equally extensive, but there was a partial scotoma in the right field, with deficient perception of colours. The usual treatments for such a condition did not appear to have very much influence upon the condition, but immediate and very great improvement followed upon removal of the exuberant tonsils and the adenoids. He considers that the mechanism of production was somewhat as follows: the altered condition of the walls of the naso-pharynx had produced stasis in the ophthalmic vein or the cavernous sinus, and so obstructed the return from the optic nerve; relief of this stasis was immediately succeeded by re-establishment of the normal circulation in the nerve. The patient seems to have suffered from a liability to affections of this class, for sciatica and secondary inflammation of several nerves followed influenza.—*La Clinique Ophtalmologique*, February 10, 1901.

HÆMORRHAGE INTO THE VITREOUS.

By N. C. Ridley, R.N., M.B., F.R.C.S.

Hon. Ophthalmic Surgeon to the Leicester Infirmary.

In dealing with hæmorrhage into the vitreous there are two sources of the effusion, producing results differing in anatomy and pathology, to be considered, viz., those arising from the retinal, and those from the ciliary vessels.

In the former case as a rule the hyaloid is detached from the retina, and the blood lies between that structure and the vitreous body, gradually pushing it forward and squeezing out its watery constituents as it increases in amount.

In the latter, owing to the presence of the fibres of the suspensory ligament, the hyaloid is more firmly attached to the underlying pars ciliaris retinæ ; and in addition, since a hæmorrhage here is due to the rupture of one of the comparatively larger vessels of the uveal tract, the blood bursts through the pars ciliaris retinæ and hyaloid too, and causes effusion into the substance of the vitreous body.

Hæmorrhages from uveal vessels posterior to the ora serrata, detaching the retina as they invariably do, are manifestly not hæmorrhages into the vitreous chamber.

It can be readily seen from the above anatomical facts that hæmorrhages from the ciliary body are much more likely to be larger, and to produce more serious

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results, due to that circumstance, than those from the retina.

An exception to what I have said of retinal hæmorrhages detaching the hyaloid is seen occasionally when that membrane and the trabeculæ of the vitreous are degenerate, with consequently increased fluidity of that body. This is frequently the condition in high myopia. I have now under my care a case of this kind, where a hæmorrhage from the macular region caused the blood to be diffused as a crimson cloud through the posterior part of the vitreous.

Cases may be classified etiologically as follows :—

(1) Traumatic.

(2) Due to general diseases such as anæmia, diabetes, renal disease, and atheroma and other vascular degenerations.

(3) Occurring in high myopia.

(4) Occurring as a complication of glaucoma.

Traumatic may be either from ciliary or retinal vessels.

In anæmia and other general diseases usually from retinal vessels but occasionally from ciliary.

Myopic invariably from retinal.

In vascular degeneration probably always retinal.

As a complication of glaucoma generally ciliary.

General appearance and symptoms.—If large, there is a total loss of vision, and the pupil will appear quite black, and no fundus reflex can be obtained. If small, the vision will be diminished and objects will appear red to the patient, but there will be no distinct scotomata to be mapped out as is the case in purely intraretinal hæmorrhages. With the ophthalmoscope, if subhyaloid, the well-known boat-shaped hæmorrhage may be seen ; but if in the substance of the vitreous body, it may take the form of a diffuse crimson cloud where the vitreous is semi-fluid, or an irregular-shaped immobile black mass where it is of the normal consistence.

In all cases where, later on, absorption is taking place, the dark mass breaks up and floating fragments can be seen when the globe is moved.

When the vitreous chamber is quite full of blood it is impossible to tell whether the case be one of hæmorrhage into the vitreous, or behind the retina causing a total detachment of that structure. The intraocular tension in either case may be normal or somewhat increased.

Course of the lesion.—Under favourable circumstances the hæmorrhage will be absorbed, the blood being decomposed partly by solution in the watery part of the vitreous and partly by the action of leucocytes, and carried off in the lymph circulation through the spaces of Fontana.

In many cases, however, the effusion of a large quantity of blood may raise the intraocular tension, causing obstruction in the circumlental space, either by mere increase in the contents of the vitreous chamber, or also by partial blocking of the meshes of the suspensory ligament by blood corpuscles. The remains of the squeezed out vitreous may cause obstruction when pushed forward in the same manner. In this way the lens-iris system is carried forward and the ordinary process of acute glaucoma results. It is very often, however, necessary here to distinguish between cause and effect, for it is by no means uncommon for hæmorrhage from the ciliary processes to occur during an attack of glaucoma, when the veins are generally engorged, of an instance of which I shall give notes later (5). I have therefore mentioned this as a fourth group in the etiological list. Under this heading, too, I include cases where hæmorrhage takes place into the vitreous during iridectomy for the relief of glaucoma, owing to a sudden reduction of the intraocular tension by a rapid corneal section. It is, however, much more common for choroidal vessels behind the retina to give way and the retina to be detached under such circumstances. I remember seeing at Moorfields the entire contents of the globe, with a rush of blood, follow the knife of an operator for acute glaucoma, certainly due to no want of care on his part; and on two occasions in my own practice I have found that a similar thing has occurred later on, when the dressings were removed on the following day. In traumatic cases especially, the simple nature of the lesion is likely to be complicated by more or less cyclitis due to bruising, and this of itself, if severe, may lead to loss of the eye.

The treatment is pretty much the same in all, viz., rest, dark glasses, avoidance of exertion, sometimes keeping the patient in bed for a few weeks, weak atropine locally (except in those cases where glaucoma is present or threatening, in which one may be compelled to perform an iridectomy in spite of the specially unfavourable circumstances), and iodide of potassium internally.

The prognosis varies widely and is very difficult to determine, but generally speaking is more favourable than in any other form of intraocular hæmorrhage. Some cases which appear to be absolutely hopeless recover in a marvellous manner, while in others the vision is permanently damaged though the hæmorrhage may be absorbed. In these latter, however, in all probability the hæmorrhage has torn up the retina, or caused the usual results of prolonged increased intraocular pressure. In my earlier days I gave a hopeless prognosis in one case where there was no perception of light, which recovered excellent vision, as I heard afterwards, without my assistance, to the increased reputation of some patent medicine, somewhat at the expense of my own.

The following illustrative cases I have taken from my more recent case books :—

Case 1.—Miss E. H., aged 16. First seen in March, 1899. Four months previously the "light had gone out of the left eye" in consequence of a fall, when she struck her nose and left eye against a railway line.

The pupil was black with a very faint reflex, and vision limited to perception of shadows only in the outer part of the field.

Under atropine, rest, and iodide of potassium the blood broke up and was partially absorbed, so that on September 18, 1899, the vision of the injured eye was $\frac{6}{12}$ partly. The patient was then very anæmic, and on that day a fresh hæmorrhage occurred, the vision being reduced to $<\frac{6}{60}$.

Iron was administered and absorption again gradually took place, so that on April 21, 1900, a good view of the fundus was obtained. The superior temporal artery seemed to be obliterated in part, with the remains of a hæmorrhage near it. Improvement gradually continued, and by February, 1901, the fundus and media of the left eye were normal and the vision = $\frac{6}{6}$. The intraocular tension was never at any time increased.

Case 2.—Mr. C. C., aged 34. First seen February 20, 1901. He struck his left eye with a whip lash a week before. The vision was $<\frac{6}{60}$. A small hæmorrhage was to be seen in the vitreous just behind the lens, from the outer part of the ciliary body. Atropine, rest, and iodide of potassium soon produced absorption of the blood, but there was a subacute cyclitis present, and also optic neuritis. These are now (March 8, 1901) gradually clearing up, and the vision = $\frac{6}{12}$ partly.

Case 3.—Mr. W. B., aged 64. Diabetes. Under treatment for neuro-retinitis for a long time. On December 18, 1898, a large subhyaloid hæmorrhage occurred in the right eye from the inferior temporal vein. It extended almost across the visible part of the fundus below the level of the disc, and had the characteristic boat-shape.

It gradually became absorbed, with return of some vision, but the latter was poor owing to the general fundus trouble. There was no increase of intraocular tension, but atropine could not be used as the other eye had been lost previously from acute glaucoma.

Case 4.—Mr. E. M., aged 22. Myopia – 18 D. in left eye. Right eye lost some years before, apparently after evacuation of soft cataract. First seen on February 1, 1901. Vision much diminished and objects appear red. Diffuse hæmorrhage into the left vitreous from a vessel above the macula, produced on the previous day by overwork and exertion. After a month in bed, with atropine and iodide of potassium, the whole effusion was absorbed, and the vision is now as it was before the accident. There is a small, nearly central, scotoma from old macular retinitis.

Case 5.—Rev. W. J. T., aged 52. Emmetropic. Had previously had several small attacks of subacute glaucoma in the left eye, from which he had recovered under the care of his own medical attendant. Was first sent to me on October 23, 1900, during another attack. Instillations of eserine reduced the tension, and vision was $\frac{6}{6}$. Iridectomy was advised to prevent recurrence, when, the day before it was to have taken place, a hæmorrhage occurred into the vitreous, reducing the vision to $<\frac{6}{60}$. Although the intraocular tension was not much raised, I considered it likely to occur in the course of a few hours or days, and decided to do the iridectomy as arranged. This was done under chloroform with as little disturbance as possible, and everything went on well. The tension remained normal and the vision gradually improved during the next few weeks, when patient was appointed to a charge in another part of England, and I have heard no more about his progress.

Case 6.—Mrs. S. M., aged 61. Came under my care on the evening of June 25, 1898, suffering from acute glaucoma of the left eye. There had been vomiting, she had great pain, high intraocular tension, and all the usual signs of acute glaucoma. There was no perception of light. The right eye had been operated upon for acute glaucoma by

Mr. Hodges on November 23, 1887, and the vision of that eye was $\frac{6}{12}$ cum + 1·5 D. sph.

A wide iridectomy upwards was done on the following morning, after applying cold dressings and eserine and cocaine drops every six hours during the night. All went off well, and the wound healed and the pain and increase of tension entirely disappeared; but there was still no perception of light. When the patient had recovered sufficiently for an ophthalmoscopic examination to be made, it was found that there was no fundus reflex. Nothing more was done until September, when iodide of potassium was administered. In December patient began to perceive light downwards. Improvement from that time seemed more rapid, so that in March, 1899, the fundus could be seen, especially the upper part. In April, 1899, the left vision cum + 1·5 D. sph = $\frac{6}{12}$ partly, and soon afterwards reached $\frac{6}{12}$ perfectly, at which it has remained ever since, without any further trouble occurring. Additional interest attaches to this case from the fact that the patient only has this eye to depend upon now and gets along quite comfortably, the right eye having been ruptured by a blow when chopping sticks in 1900, and subsequently enucleated.

REVIEWS.

HENRI COPPEZ (Brussels). Interfascicular Endothelioma of the Choroid. *Arch. d'Ophtalmol., January, March*, 1901.

Coppez' careful and valuable paper was written *apropos* of a case of interfascicular endothelioma of the choroid which came under observation in the clinque of Prof. J. B. Coppez in the University of Brussels. He begins it by referring to the confusion which exists on the subject, as judged from the literature, and expresses his belief that many cases of this form of tumour have been described under other names. In this he is, in the reviewer's opinion, correct, and his article is a useful contribution to our knowledge of a confessedly difficult question in pathology.

Coppez writes under three headings: (1) The general characters of endothelioma; (2) Description of a case of endothelioma of the choroid; (3) Critical and bibliographical *résumé*.

The general characteristics of endothelioma. An endothelioma is a tumour developed from endothelial cells, of which there are several varieties: those which carpet the connective-tissue bundles and the lymphatic spaces between them; those which cover serous membranes; those which clothe the blood and lymph vessels.

Of these three groups the first is most frequently the seat of new growth.

The choroid coat does not contain lymph vessels, hence the endothelium of the tissue is almost entirely interfascicular, *i.e.*, it is not in immediate relation to vessels. In other parts of the economy it is unusual for endothelioma to spring exclusively from one variety of endothelium; there is often simultaneous proliferation of endothelial cells from lymphatic spaces and lymphatic vessels.

In addition to pure endothelioma, there are forms which are transitional between this and sarcoma. Such tumours arise from the walls of blood-vessels or their immediate neighbourhood, developing from the perithelial cells of capillary blood-vessels, which in some tissues, *e.g.*, the salivary glands, form a sheath to the capillaries.

These transitional forms of tumour have many points of analogy with true endothelioma, and numbers of writers do not distinguish between them. As pointed out by Volckmann, endotheliomata show a tubular arrangement of their cellular groups, while the transitional tumours exhibit a plexiform pattern resembling that of the blood capillaries from which they spring; their cells also are fusiform, and the nuclei smaller and more easily stained than is the case in endothelioma. It is therefore very desirable for clearness of classification to separate endotheliomata from peritheliomata.

In the choroid, in addition to interfascicular endothelioma, which has no intimate relation to vessels, we meet with tumours of connective-tissue origin growing from the perithelial or adventitial cells of the vessels. Such new growths are designated peritheliomata by some writers, angio-sarcomata by others.

Sarcoma, perithelioma, and endothelioma, all originate from connective tissue, and are closely related tumours. They may indeed be all grouped under the heading sarcoma, an arrangement which is histo-genetically correct.

Peritheliomata are in more intimate relation to vessels than endotheliomata; the latter at the outset are quite independent of the vessels. It is, however, common for an endothelioma to exhibit in parts the appearances of perithelioma or of ordinary sarcoma.

Theoretically we find in the choroid: (1) sarcoma, growing from the proper cells of the choroid; (2) Perithelioma arising in the perithelial cells; (3) endothelioma springing from the cells lining the lymph spaces.

Practically the distinction is by no means so simple. It is probably true that every sarcoma of the choroid contains foci which are typically perithelioma, and that in an endothelioma there are always parts which are in character peritheliomatous and sarcomatous. To classify the variety of tumour it is necessary to determine which of the cellular elements of the choroid have undergone the greatest proliferation, and to consider the general arrangement of the newly-developed cells.

Coppez devotes several paragraphs to a consideration of the various names introduced by writers at different times, names which have given rise to considerable confusion by reason of their use in a wider sense than was originally intended. Such terms are hæm-angio-sarcoma, lymph-angio sarcoma, &c.

According to his views, three types of primary new growths are met with in the choroid.

(1) Interfascicular endothelioma, developed from endothelial cells lining lymph spaces.

(2) Perithelioma (perivascular hæm-angio-sarcoma of

Lubarsch, angio-sarcoma of Gunther), developed from the perithelial cells of the blood-vessels of the choroid, and following the course of the vessels.

(3) Sarcoma of varying character, growing from the proper cells of the choroid, from the perithelial cells of the vessels and also the endothelial cells of lymph spaces, but in their growth not retaining any close relationship to the vessels.

The primordial characters of these tumours can be clearly distinguished only in their early phases, before the neoplastic elements have greatly altered the pre-existing tissue. In very small growths, or at the extreme periphery of large ones, the true histological features will be found. Before describing the chief characteristics of interfascicular endothelioma, the author draws attention to the great modifications in structure which this form of. tumour may undergo, so altering the type that mistakes may easily be made, and probably have frequently been made.

In the normal condition the endothelial cells are distinguishable only by their somewhat elongated flattened nuclei. In the earliest stage of neoplasm these nuclei undergo tumefaction, and the nucleoli become obvious. The protoplasm becomes visible and this gives the cell a fusiform appearance in section. The cells rapidly proliferate and are arranged in series in the lymph space. By mutual pressure they become polygonal, except such as are terminal. The protoplasm of these cells is more coloured by eosin than the connective tissue. Their nuclei, on the contrary, are less stained by hæmatoxylin than the neighbouring leucocytes and the nuclei of normal endothelial cells (Coppez gives illustrations of the early stage of an endothelial and perithelial tumour). As growth progresses the rows and columns of cells increase in size and form compact masses which, in their appearance and in the form of their cells, bear a striking resemblance to carcinoma. The growths can be differentiated by their relation to the surrounding connective tissue. In the early stage the carcinomatous cell extensions are in no intimate relation with this tissue, from which they are separated by the endothelial lining of the lymph spaces. In endothelioma the cells of the tumour are very intimately connected with the connective tissue. If the cellular columns extend chiefly in a lateral direction the tumour assumes an alveolar character.

The chief modifications to which interfascicular endothelioma is liable are the following:—

(*a*) Arrangement of the cells in concentric layers, giving an appearance likely to be mistaken for epithelioma.

(*b*) Hyaline or colloid degeneration of cells, giving the appearance of cylindrical spaces surrounded by cells and resembling gland structure.

(*c*) Cystic degeneration, giving in section appearances very like lymphangioma.

(*d*) An alteration in the type of growth in a later stage, whereby a tumour scarcely distinguishable from an alveolar sarcoma may result.

(*e*) Hyaline and mucoid degeneration of the connective tissue in which the tumour develops and, rarely, cartilaginous degeneration.

The exact relation of the tumour elements to the blood and lymph vessels may also determine to a certain extent the microscopic characters. The rule is that in endothelioma the blood-vessels play quite an unimportant *rôle*, and bear no intimate relation to the neoplasm.

According to Volkmann the participation of lymph vessels in the growth of the tumour is but small; in some instances, however, the pathological process extends by continuity from the endothelium of the lymph space to that of the lymph vessel. In other cases the growth invades the lymph vessels irrespective of their lining endothelium.

It is obvious from such considerations that endothelioma may easily be mistaken for other forms of new growth. Volkmann has rectified the diagnosis in many reported cases of tumour of the palate, and Van Duyse in tumours of the lachrymal gland.

It would seem, as will be pointed out, that a similar correction is requisite for certain new growths of the choroid, and especially of the ciliary body.

Author's Case of Interfascicular Endothelioma.—The patient was a woman, aged 63, upon whom double iridectomy, preliminary to extraction of cataract, had been performed elsewhere. When she came under Coppez' care in August, 1894, the right eye was glaucomatous, anterior chamber abolished, lens completely opaque, no pupil. The right eye was excised, and patient made a good recovery. She died during the following year from metastatic growth in the orbit and brain.

Examination of the globe, after hardening, revealed a flattened tumour in the *nasal* half of the choroid, extending from the optic papilla to the ora serrata. The new growth was closely applied to the sclera, and all trace of the choroid had disappeared over the area involved.

On section the tumour had a distinctly lobulated appearance suggestive of carcinoma or alveolar sarcoma. The lobules were of varying size, and towards the anterior part were several unusually large ones, divisible into secondary foci.

The chief lobules were encircled by connective tissue, which in many places had undergone mucoid degeneration. Between the large lobules were numerous secondary lobules, especially alongside the sclera. The cells of the tumour had penetrated the sclerotic along the course of perforating vessels. In the neighbourhood of the papilla was a deeply pigmented portion which showed advanced mucoid degeneration.

The characteristic structure of endothelioma was visible in sections at the periphery of the mass, and Coppez gives an illustration of a portion of the anterior edge. In this part it is easy to demonstrate the islands of new cell formation in the midst of a loose fibrillar connective tissue, which in parts is becoming mucoid. At the side of normal lymph spaces are swollen endothelial cells jutting into the spaces. Adjoining this are neoplastic columns, consisting at first of a single row of cells, and presently enlarging to form small nodules. In such a section the new growth is seen in all stages of development. The blood-vessels are not in relation of the newly-formed elements, and themselves exhibit no change from normal. In other parts where the growth is older changes in the capillary blood-vessels are visible, proliferation of the perithelium is taking place, and the characters approach those of perithelioma. In still another portion of the growth the cells have undergone hyaline degeneration, a change which is the rule rather than the exception in endothelioma. The capillaries traversing the degenerate area are but little affected, but some irregularity in their calibre is visible. In places the connective-tissue elements have also a hyaline appearance.

The microscopic characters of the tumour are shown in several illustrations.

(*To be continued.*)

JOCQS (Paris). The Part played by Osmosis in the Treatment of Detachment of the Retina. *La Clinique Ophtalmologique*, April 25, 1901.

Dr. Jocqs first gives an account of the case which he brought before the French Society of Ophthalmology, and then proceeds to explain his views on treatment.

The patient, first seen in July, 1899, was found to have myopia of 8 D., with considerable detachment in the left eye. The treatment first employed was the evacuation of the sub-retinal fluid followed by the use of a compress bandage. Prolonged dorsal decubitus was not carried out. Repeated punctures were made, but after each operation the subretinal fluid re-formed in part. Eight days after the last puncture acute iritis set in, but subsided in five days under treatment by atropine; posterior synechiæ, however, remained. (Jocqs attributes the iritis to the pressure of the bandage in the low state of ocular tension which followed evacuation of the subretinal fluid.) At this stage detachment was still present to about half its original extent. Subconjunctival injections of sodium chloride solution were now employed (1 per cent. to 2 per cent.) but without success. A syringe half filled with a saturated solution was then tried. This caused considerable pain, which was, however, moderated by the use of cocaine (1 per cent.). For some reason the patient could not return for examination for a fortnight, but at the end of that time the detachment had entirely disappeared. At the upper part the visual field had improved from 15° before the last injection to 35° after it, and was nearly normal in the other meridians. The visual acuity remained very defective, being only equal to fingers at half a metre. The low visual acuity was accounted for by the extended duration of the detachment—nearly a year—which probably caused loss of vitality in the retina; also by partial occlusion of the pupil following iritis, and by the effects of an intercurrent attack of glaucoma.

The above was the condition of the eye in June, 1900. One month later the patient reappeared with acute glaucoma, for which iridectomy was performed. The retina was at this time seen to be in its normal position.

Jocqs then proceeds to explain his reasons for preferring the saturated to the weaker solution of sodium chloride; he points out that the use of subconjunctival injections of sodium chloride is only a revival, as this method was used in earlier times. With regard to recent work on the subject he refers to the paper by Staerkle, who reports twenty-three cases of beneficial result from the use of sodium chloride solution of 2 per cent. to 10 per cent. Other writers are Mazzoli and Vinselmann, who also report successful cases. Jocqs bases his therapeutic idea on the theory of diffusion brought forward by Raehlmann, with which he is in accord; he also refers to the recent clear exposition of certain questions regarding osmotic pressure by Vaquez and Bouquet (*Presse Médicale*, April 5, 1900).

As is well known, the attractive force on which the process of osmosis depends, is proportional to the difference in degree of saturation of the two solutions, and varies with the nature of the solutions themselves. The fluid if less concentrative, is attracted towards that of greater concentration, thus setting up diffusion, which proceeds until the equilibrium of concentration is reached, osmosis being arrested as soon as the isotonic state of the fluids has been established. According to the foregoing laws, Jocqs argues that the saturated solution of salt will prove more active than the weaker solution, and when injected will have a more powerful effect in causing the absorption of the subretinal fluid. The sclera and choroid are not compared directly to the animal membrane of a dialyser, but it is supposed that the blood of the choroidal vessels, becoming charged with salt by absorption, in turn attracts and absorbs the subretinal fluid; or perhaps that even short of this a good effect may be the result of diminution of the tendency to the transudation of serous fluid from these vessels.

While it is argued that detachment of retina may be cured by a temporary alteration in the osmotic relationship, it is not contended that the original lesion which first produced the detachment can thus be altered; but it is suggested that, as the conditions which cause detachment may be of a transitory nature, and may not recur, the rapid replacement of the retina before it has lost its vitality may prove of permanent benefit.

Dr. Jocqs' final conclusions are :—

(1) That subconjunctival injections of salted water, preceded by scleral punctures, hold the first place in the treatment of detachment of the retina; numerous observations support this contention.

(2) If success has been incomplete, it is because the solution has been too weak. The modern ideas on osmosis show how necessary it is to use strong solutions.

(3) The saturated solution can be easily borne with the help of cocaine.

(4) In order to avoid iritis the pressure of the bandage must be only moderate. This last is suggested by Jocqs because he attributes the occurrence of iritis in his case to the tightness of the bandage.

In the discussion which followed the reading of the paper M. Darier referred to his own experiences in this connection, and said that ten years before he had employed subconjunctival injections of perchloride of mercury, both alone and in combination with sodium chloride. He referred to some favourable results which he obtained. Darier regarded the sublimate injections as especially suitable to those cases of detachment which are associated with exudative choroiditis. Dr. Jocqs, in replying, said he did not wish it to be supposed that he regarded subconjunctival injections of sodium chloride as a panacea for all cases.

A. H. H. SINCLAIR.

A. BOUCHART. Contusion of the Eye. *Recueil d'Ophtalmologie, January*, 1901.

The subject of contusions of the eye is in this article chiefly regarded by the author, who is on the medical staff of the French army, from the point of view of the alterations in refraction which such an injury is capable of bringing about ; it is a topic on which he has already contributed to our knowledge. He divides those interesting cases of traumatic myopia into two classes, namely, those in which there is also rupture of the choroid, and those in which there is no injury to the coats of the eye, and it is particularly to the first of these two groups that he devotes the present article. He considers that we may regard the myopia and the rupture of the choroid as the slighter and the more advanced stages respectively of the same process. Saemisch's explanation of the mechanism of rupture of the choroid is briefly that the blow which is received by the globe produces a depression of its coats at the spot at which it is struck ; and from the fact of the very intimate adherence of choroid and sclerotic, caused by the penetration of the posterior ciliary vessels, it results that the soft choroid, being fixed firmly down at these points, is unable to alter its shape or position, and gives way just outside. Arlt adds to this that the temporary increase of the intraocular tension as the anterior parts are dimpled in by the blow, assists to cause the vascular coat to give way; Fage's views are not dissimilar, he regards the points of exit of the venæ vorticosæ as the fixed points, between which and the disc the choroid always yields. Whichever of these very closely similar theories may be adopted, it is manifest that the chief point is the fact of the difference in elasticity of choroid and sclerotic; the latter can quite well survive a distension which will cause the former to become ruptured. In addition, the same force which has proved sufficient to rupture the choroid may have had the effect of distending the sclerotic in all its dimensions, a distension from which it recovers its old dimensions only slowly and after the lapse of some time, its elasticity is not sufficient to enable it to return to its normal condition at once. Should this occur, the mechanical pressure of the muscular cone outside the globe prevents expansion in any direction other than the antero-posterior, the only opposition offered along the axis being the trifling one of the orbital fat. At the same time the distension of the anterior parts of the sclerotic beyond the attachment of the muscles gives rise to rupture of the zonule. In the favourable cases the sclera gradually resumes its normal form and dimensions within a short period of time, but everything depends on the violence of the blow and the recuperative elasticity of the tissue. It is interesting to note, as bearing out the truth of this view entertained by the author, that sometimes the rupture in the choroid appears, if examined only a day or two after the accident, much broader than it afterwards becomes, owing to the gradual recovery of the sclera.

To turn to the second class of these cases, namely, those in which, along with the traumatic myopia, there is no rupture of the choroid,—Bouchart suspects that not infrequently they may be regarded as examples of "Commotio Retinæ." As Berlin has pointed out, vision is as much affected in certain of the cases of commotio retinæ where there is no ophthalmoscopic lesion visible, as in others in which there are manifest changes. There is often marked photophobia, much circumcorneal injection, and decided resistance on the part of the pupil to the action of a mydriatic, in addition to lowering of central vision. In experiments on the rabbit Berlin was able to prove the presence of an abnormal activity of the sphincter pupillæ, distension of the zonule, worse at certain points than at others, and compression here and there of the periphery of the crystalline, which he thought might help to account in man for visual defects for which one could find no obvious fundal cause. It must be remarked, however, that the conditions in the neighbourhood of the zonule are by no means precisely similar under normal conditions in the rabbit to what obtains in man. Berlin's view, at all events, was that a traumatic astigmatism, irregular but transitory, caused by hæmorrhages in the immediate vicinity of the lens, was the probable explanation of the temporary loss of accurate vision. Yvert, however, raised the very pertinent objection to this theory that the myosis which always (?) existed must necessarily cut off the optical effect of any astigmatism which could be caused in the peripheral parts of the lens by hæmorrhages lying close to it about the ciliary body. The explanation may for all that hold good in those cases in which the pupil is not contracted.

Dufour suggested in 1874 that by rupture of part of the zonule, the lens is to a certain degree set free to adopt its attitude of maximum curvature, the curvature which it adopts when freed from the compression exercised by the zonule; accommodation would then be without influence on it.

In some of the cases the anterior chamber is shallow; this cannot be due to any increase in the tension in the vitreous, for the intraocular tension is probably always lowered; it is explained by Schiess-Gemüseus as being due to interference with the tissue from which the aqueous is secreted.

Bouchart gives the following details of an interesting case which came under his own observation. A young soldier received a severe kick on the outer side of the left orbit; the eye itself was not directly injured. One hour after the accident he could not count fingers at 1 m.

distance. There was nothing to be observed in the fundus, the media were clear, and no ametropia was recorded. On the third day retinoscopy showed hypermetropia of less than 1 D., and he could now count fingers at 1 m.; the other eye was found to have hypermetropia of 4 D., with acuity of vision slightly above the normal. Within the next day or two vision in the injured eye rose to ½, and on the tenth day it was perfect, and the eye showed H. of 3 D., of which only 2 D. was manifest. The pupil remained dilated, but neither iris nor lens was tremulous. The case might be regarded as one, besides the immediate shock, either of slight distension of the zonule, or of spasm of the ciliary muscle without implication of the iris.

In another case, a man who had been famous in his regiment as a good shot, and who, therefore, must have formerly had first-rate sight, received a severe blow above the right eye. Nineteen days later there was still a myopia of 6 D. with diminished tension, but with no visible damage to fundus or media.

As to the explanation of these and similar cases, Bouchart says it must be admitted that alteration of the position and attitude of the crystalline will suffice to produce the symptoms; at the same time one must not regard the eye as a mathematical instrument merely, but keep in view the anatomical and physiological arrangement of the parts in the region most liable to injury. The pupil, as we know, may after such an injury be contracted, or merely immobile, or dilated from complete paralysis of accommodation, and what happens to the iris may no doubt happen also to the ciliary muscle; it may be in a state of spasm, of immobility, or of paralysis. As regards the question of spasm, it must be added that while some have pointed out that a drop of atropin would set the matter at rest by neutralising that state, others have found that atropin produced much effect only after long resistance. Perhaps a more serious difficulty lies in the fact that in some of these cases *spasm* of the ciliary muscle was accompanied by *paralysis* of the iris. Where there is a probability of distension of the zonule having occurred, there is no need to complicate matters by supposing either a paralysis or a spasm of the ciliary muscle, but of course, should the lens be in any degree freed from the influence of the zonule, neither paralysis nor spasm of the ciliary muscle could have any influence upon its curvature.

The question of the precise manner in which the damage to the zonule is produced is quite simple; it may be explained either by the mere distension along all radii of the peripheral attachments of the zonule, or by the blow suddenly forcing the aqueous humour against it along its whole anterior surface. Bouchart, however, thinks a somewhat more complicated explanation may be the correct one. Knowing, as we do, that the fixity of the crystalline is not absolute, he considers it possible that the rupture or relaxation of the zonule is due to the to-and-fro movements of the crystalline before it comes to rest again after it has been driven backwards. It is not easy to see any sufficient reason for calling to our aid a more elaborate explanation when the customary simpler one is entirely satisfactory and less open to adverse criticism.

The author mentions that it has been proposed to treat hypermetropia on the lines on which myopia is thus traumatically brought about. By means of regulated massage it was hoped that one might produce sufficient enlargement of the globe to cause the suspensory ligament to yield slightly, and so permit the lens to acquire a higher refractive power. He does not recommend such risky procedure. W. G. S.

OTTO SCHEFFELS (Krefeld). Cauterisation of the Lachrymal Sac and its Significance for the Practitioner as compared with Extirpation of the Sac. *Klin. Monatsbl. f. Augen., April*, 1901.

Scheffels has in mind those cases of chronic catarrhal dacryocystitis which arise for the most part in consequence of hypertrophic or atrophic rhinitis or deviation of the septum, and only rarely from primary periostitis or ostitis around the nasal duct. Cases due to occlusion from suppuration of the sac in the newborn, and those secondary to suppuration in neighbouring cavities, are not included.

In spite of the nasal genesis of the disease, when once suppuration of the lachrymal sac is declared treatment applied to the nose alone is insufficient, and must be extended to the sac itself.

Many are content with such measures as division of the stricture, scarification of the mucosa, irrigation and passage of probes, wearing of a style and massage, but Scheffels finds that there are cases in which the purulent discharge still continues, and in which more radical measures are necessary. These cases comprise not only those severe cases in which recurrent attacks of inflammation with fistula, bony obstruction from periostitis, &c., take place, but some apparently simple cases in which there is free exit for the pus and yet the mucous membrane does not become healthy.

When any eye operation is likely to be necessary the importance of getting rid of any lachrymal trouble first is obvious.

Extirpation of the sac requires a general anæsthetic, one or two assistants at the operation, and five or six days' confinement in the house. Cauterisation can be done without general anæsthesia and assistants, and the patient may be treated as an out-patient. Extirpation takes much longer owing to the difficulty in stopping the free hæmorrhage. Further, it is at times a difficult operation, especially when much probing has been indulged in beforehand, with resulting false passages and chronic surrounding inflammatory thickening; or the suppurating sac may have become atrophied and thinned, with obliteration of its cavity, instead of hypertrophied and dilated, and it may require the passage of a probe to reveal what is the interior of the sac.

Scheffels has performed extirpation of the sac in twenty-three cases, with an immediate and perfect result. It is especially indicated when operation on the globe is to be done, and where infected corneal ulcers are present. Yet there are cases in which cauterisation is preferable.

The author's method of cauterisation is that which he has seen employed by H. Pagenstecher. Both puncta are dilated and the canaliculi slit up directly into the sac, not merely to the caruncle. The blade of the knife is now turned forwards and inwards, and made to divide with slow sawing movements the sinewy hard tendo palpebrarum; as it does so it is advanced towards the bottom of the sac, and any strictures at the entrance to the sac are divided. One's object is attained when the knife introduced by the slit upper canaliculus can be moved easily and freely to the lower part of the sac and beginning of nasal duct, and outwards to the slit lower canaliculus. Bleeding, which is prompt, can be stopped by pressure, and the survey of the field of operation can now be made easier by the insertion of a lid speculum, which also facilitates the introduction of cotton wool into the sac. After some minutes the cauterisation of the sac can be done. He employs Vienna paste (fused caustic potash 5, caustic lime 4, alcohol 10 parts), and the application is made in two stages, or even three if the sac be very dilated. He takes a piece the size of hemp seed, surrounds it with a thin layer of cotton wool, and introduces it with shovel forceps into the depths of the sac. In two minutes it is removed, and the bottom of the sac wiped out with cotton wool. Again a small piece is introduced, and left near the entrance of the canaliculi for two minutes. The eye is protected by vaseline in the conjunctival sac and by rotating it outwards. For anæsthesia a half-syringeful of 3 per cent. tropacocain in normal saline solution is injected at two spots just before the operation, and 1 per cent. holocain solution is repeatedly dropped into the conjunctival sac and the lachrymal sac. The whole procedure takes ten to fifteen minutes. He has sometimes been able to do the operation on very nervous people by assuring them that only preliminary steps were to be taken and the operation concluded next day! Some chemosis and œdema follow the operation; pain can be relieved by ice compresses, and after the second day hot fomentations quickly afford relief. For ten to fourteen days the patient should attend daily to have fresh dressings introduced and to make sure that no remnants of mucous membrane exist. The necrotic mucosa is bit by bit extruded. Scheffels has never seen any damage done to the bone around the sac by this procedure. After ten to fourteen days granulations begin to fill up the cavity. At latest, in three weeks healing is complete, and the cosmetic effect is quite satisfactory. No scars are to be seen. Sometimes there is shrinking of the caruncle and slight narrowing of the palpebral fissure; watering of the eye occurs for some time. Of thirty-seven cases in which he carried out this procedure the desired effect was obtained in thirty-five without complications. In the other two suppuration showed itself again soon after recovery from the operation, and fistulæ resulted; in one up and out towards the orbital margin, in the other up and in towards the lachrymal bone. In both there had been numerous false passages made by the prolonged use of probes, and much inflammation. In both the fistulæ closed as the result of treatment (scraping, &c.), leaving small scars adherent to the bone.

Co-existing affections of the adjacent bone (primary tuberculous periostitis and ostitis; gummatous periostitis; periostitis secondary to retained secretions or immoderate probing) contraindicate corrosive measures. But such complications are much rarer than text-books would seem to show; such cases are best treated after removal of the sac by scraping, and iodoform or aristol.

On the other hand, cases which may be treated by corrosion are those in which an anæsthetic is dreaded or is undesirable; in which lachrymal fistula already exists; in which recurrent attacks of inflammation around the sac are frequent; and in which there are false passages from probing. It may also be employed in the case of plethoric women about the time of the menopause, so as to avoid the excessive bleeding which extirpation entails, and in cases in which it may be particularly desirable to have a good cosmetic result.

W. WATSON GRIFFIN.

SCRINI (Paris). Congenital Strabismus. *Archives d'Ophtalmologie, May*, 1901.

The attention of Professor Panas and of the author of this interesting paper was recently drawn by Pinard to the occasional occurrence of strabismus among the infants of primiparous women; inquiry showed that such cases are not so infrequent as one might suppose, and that apparently the ancient idea of squint being a congenital lesion is not without some foundation. It is not necessary to follow the author through his references to the subject in the works of every writer of note, from the inevitable Galen Avicenna, and Ambrose Paré down to the present day, but it is certainly interesting to note in passing the multitude of references in the older writers to the congenital occurrence of strabismus.

The author set to work methodically, and at the Baudeloque Clinique watched from birth to the fifteenth day at least, 136 infants, of whom no fewer than 60, or almost one half, showed signs of strabismus. This squint, which was always convergent, alternating and periodic, was not at all times very easy of immediate recognition, owing to the vague, expressionless aspect of the new-born child. Among another set of 120 infants, aged from a fortnight to six months, in whom he had carefully noted this point, 35 squinted more permanently instead of occasionally; the mothers often noticed this fixed squint, though the previous vague and occasional squint might have passed unnoticed. Among a considerable proportion, then, of the 35, functional strabismus was the result of the condition of affairs observed congenitally.

A striking feature of these congenital cases was the relatively great frequency among the infants of primiparous women, as Pinard had already remarked; the infants of multiparæ were much more rarely attacked. Thus, out of 61 children of primiparæ, 40 squinted, a percentage of 65·5; of 30 children of secondiparæ, 10 squinted (33·3 per cent.), of 22 other infants of multiparæ, only 4 squinted (18 per cent.). Such cases as he was able to find in Tarnier's

Clinique showed a proportional incidence not dissimilar. There can be no doubt of the fact that this form of strabismus is much more frequent among the infants of primiparæ, in whom, *ceteris paribus*, labour is apt to be longer and more arduous than in multiparæ; more precise enquiry showed that the frequency of the occurrence of strabismus bore a striking relation to the duration of labour, the more protracted the labour the higher the proportion of squint in the infants. But while this is so, it is not by any means only among the infants born after prolonged or obstructed labour that squint is observed, and Scrini does not find it easy to say what other element is at work. Heredity has been suggested, but in this condition heredity is not a very powerful factor. Fournier, as is well known, attributes to hereditary syphilis a *rôle* of great importance in squint, but he seems to stand alone in so doing. No other author seems to regard syphilis as sufficiently serious to be reckoned with in this connection, though of course a syphilitic child is often ill-developed in regard both to the eye and to the nerve relationships as well as in other directions.

The reviewer is not quite prepared to accept the conclusions arrived at by Scrini on this subject, as indicated above, though the record of them is interesting. It does not appear to him that these temporary malpositions of the eye in an infant of a few days old have any real connection with strabismus proper. Before squint can be present, macular vision with one eye (at least) must be established, while these infantile movements are not in any way purposive, for there is no attempt or desire to direct the macula upon a light even, at a time so very early as is indicated. The movements are inco-ordinate, they are mere experiments in the newly-acquired art of moving the eyes in different directions; and, indeed, it is not impossible that in the infant all movements may not be so very strictly conjugate as they are in the adult. The reviewer then is unable to accept, without reservation, the accuracy of M. Scrini's observations as to alternating squint in the infant—does not even the excessive frequency with which he noticed its presence point very decidedly to an error? It is surely too much to expect one to credit that 65·5 per cent. of the children of primiparæ "squint" in the proper sense of the word.

W. G. S.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

JULY 5, 1901.

G. ANDERSON CRITCHETT, F.R.C.S.Edin., President, in the Chair.

THE President of the Society, Mr. G. Anderson Critchett, occupied the chair for the last time, thus concluding an unbroken record of attendances at all meetings held during his Presidency from October, 1899.

Gumma of the Orbit.—Mr. C. Wray showed a case occurring in a male patient 61 years of age. The first indication of anything being wrong was a mild conjunctivitis of the follicular type on March 28, 1901. On April 24 a suspicion of proptosis. The fields of vision and fixation were normal. Vision R. and L. $\frac{6}{18}$, cum. sph. + 1·5 D. $\frac{6}{6}$. Pupillary reactions normal. Three days later there was marked proptosis with displacement of the globe downwards and outwards. No tenderness of the orbital margin nor interference with the movements of the globe, and no diplopia in upper part of field. Potassium iodide was given in gr. x. doses three times a day at first, and increased to gr. xxx. as the proptosis became more marked and the conjunctiva so chemosed as partly to cover the cornea. Later, when the cornea seemed to be in danger on account of inability to close the eye, incisions were made round the orbit, but as this gave only a negative result, boracic acid compresses were applied, and the doses of iodide increased to gr. xl. with a still further increase to ʒi. on June 6, after which the condition began to improve rapidly. At the present time there is some difficulty in raising the upper lid, and some swelling between the tarsal cartilage and the edge of the orbit, but there is no distinct tumour to be felt, and the proptosis is very slight. Vision is still $\frac{6}{6}$ with correcting glass, and no fundus changes are visible except a slight haziness of the upper part of the right O.D.

Cystic Growth in the Retina.—Dr. W. C. Rockliffe showed a female patient, aged 46, with this condition in the left eye; she had had a scirrhous tumour of right breast removed in October last.

The whole retina appeared bulged forwards in four cyst-like translucent masses, which pressed one against another and almost entirely filled the vitreous chamber. The anterior chamber was shallow, lens clear. T. + ? No perception of light. Left pupil larger than right, with consensual reactions only. There was no history or indication of specific cardiac or renal disease, nor of any injury to the eye. The right eye also showed general haziness of the media, the O.D. pinker than normal, with its margins ill defined, especially the upper and inner; the retina appeared swollen over the greater part of the fundus; there were slight choroidal changes at the periphery. Vision cum. sph. + 1·5 D. $\frac{6}{9}$.

The disease in the left eye began with sudden failure of vision by artificial light, not accompanied by any other symptoms. Later, intense optic neuritis with hæmorrhage into the O.D. was observed, together with looseness and detachment of the retina at the lower part; still later neuralgic pain in the eye was complained of.

Mr. Devereux Marshall pointed out that this case corresponded in almost every particular with some forty recorded cases of metastatic carcinoma of the eyeball mentioned in a paper by him in the *Royal London Ophthalmic Hospital Reports*, in a considerable number of which both eyes were affected. He considered that the tension in these eyes was usually normal, from the fact of the growth being flat and occupying a considerable superficial area, and not taking the form of a solid tumour protruding into the eyeball. In this case he considered that there was a layer of fluid beneath the retina giving rise to the extensive detachment, and that the right eye was becoming similarly affected. He strongly advised excision of the left.

Tubercular Choroidal Affection.—Mr. Marcus Gunn showed a case of an exceptional form of choroidal affection, probably of tubercular nature, in the macular region of right eye. The patient, a young girl, first complained of failure of vision in the right eye three months previously. Vision R. $\frac{6}{18}$, L. $\frac{6}{6}$.

The condition present was that with clear media at and near the macular region are one large and three smaller soft edged, elevated, patches of a pale yellow colour; all round these patches are numerous small pale round spots, some bordered by pigment, some soft-edged and not pigmented. There was some slight dulness with harsh breathing over the apex of right lung, but no evidence of any acute change. Since her first visit several small spots had developed in the right fundus between the macula and O.D., nevertheless the vision had improved to $\frac{6}{9}$.

The special feature of interest in this case was the development of small spots resembling guttate choroiditis, with a recent exudative choroiditis present, giving rise to the idea that the central portion is a caseating tubercular mass with the development of miliary tubercles round it.

Vitreous Opacity.—Mr. Inglis Taylor showed a patient with a curious form of vitreous opacity. The entire vitreous was filled with fine opacities, and in addition one large floating globular mass was to be seen attached by a fine filament, looking like a captive balloon. Retino-choroiditis was also present.

"*Hole" at the Macula.*—Mr. Harman showed a female patient, aged 65, with a hole at the macula in right eye, with an accompanying history of a blow on the eye forty-three years before, but occasioning no immediate loss of vision. The vision in that eye was $\frac{6}{60}$; cum. sph. —·75 D. $\frac{6}{36}$; and J. 5. At the site of the macula in this eye there was a small oval depressed area, in size about $\frac{1}{3}$ that of the O.D., with well-defined edges and surrounded by a ring of diffuse whiteness. The field of vision presented a central scotoma. This case closely resembled those reported by Mr. Ogilvy in his paper read before the Society in 1900, but in all the reported cases the defect of vision followed quickly after the blow on the eyeball and not with any interval so prolonged as forty-three years.

Amblyopia from Salicylate of Soda.—Mr. Simeon Snell read an interesting paper on a case in which blindness was occasioned by the internal administration of salicylate of soda to a girl, aged 9, suffering from acute articular rheumatism. The drug was administered in 5 grain doses every three hours and continued till the third day, on the morning of which the girl, after having spent a very restless and disturbed night, woke up complaining that everything was very dark ; later on wished the gas to be lighted as it was so dark. A few hours later she became unable to distinguish light from dark. The next day when seen by Mr. Snell she was still suffering from articular rheumatism and was perfectly blind, there was not even perception of light, the pupils were slightly dilated but still active to light ; the media was clear and there were no fundus changes. The sensation of cornea and surface of the eyeball were unimpaired. There was no deafness nor was tinnitus complained of. The next day the patient was much worse, suffering from peri-endocarditis, but nothing abnormal appeared in the fundus, though she was still blind. She died that night, but no necropsy was made. It was calculated that in about sixty hours the patient must have taken from 140 to 160 grains of the salicylate of sodium.

Mr. Snell thought there was no doubt that the drug had been the cause of the blindness, and mentioned other recorded cases, as set forth in De Schweinitz's work on Toxic Amblyopias, especially referring to the case by Gatti, which was very similar to the above, but in which, after ten hours of blindness, the vision returned to counting fingers, and twenty-four hours later sight was completely restored.

Melanotic Sarcoma of Conjunctiva.—Mr. J. B. Lawford read some further notes on a case of a female patient, aged 57, suffering from melanotic sarcoma of the conjunctiva, who was shown before the Society in June, 1896, in whom the right ocular conjunctiva was the seat of recent, but increasing pigmentation (*vide Trans. Oph. Soc.*, vol. xvi., p. 50).

The subsequent history of the patient was as follows : in July, 1896, a flattened pinkish nodule appeared in the conjunctiva and sub-conjunctival tissue close to the upper nasal border of the cornea, and soon after this a second similar growth developed below the first, but apparently unpigmented, whereas the originally pigmented area became more so and increased in extent. In August, 1896, the cornea, previously clear, became hazy and grey in its lower central part, and the tension of the eyeball slightly raised : this was accompanied by some pain. No intraocular changes were observed. On October 1, 1896, the whole eyeball, together with all affected conjunctiva, was removed. On examination of the growth by Mr. Marshall, the pigmented part was found to consist of small, deeply pigmented spindle cells situated in conjunctiva and sub-conjunctival tissue, the pigmented cells being in some places quite superficial, and spreading into the epithelium over the margin of the cornea at one point. The two nodules consisted of loose connective tissue with large blood-vessels. No invasion of sclera or intraocular growth.

In May, 1897, the patient became very ill, with indications of an intracranial tumour; these symptoms, however, passed off, and she recovered her usual health.

In October, 1897, a hard pinkish nodule of new growth, the size of a red currant, pigmented at its base, was removed from the upper part of the orbit. Sections of this nodule were cut and examined by Mr. Marshall, and proved to be a mixed round and spindle-celled sarcoma with some pigment at one part.

In September, 1888, a recurrence of very vascular new growth, from which there had been hæmorrhage, was removed, there being no attachment to the wall of the orbit. Dr. Jenner examined this and reported it to be a sarcoma, spindle-celled and pigmented. In April, 1899, a pigment spot about the size of a small pea was noticed on the inner surface of the lower lid, and in September, 1889, a recurrence took place in the upper part of the orbit. No evidence other than the cachectic appearance of the patient could be obtained pointing towards general systemic infection. In the same month the entire orbital contents were removed, and the growth again examined and reported to be a melanotic sarcoma. The patient was seen again in March, 1900; there was then no further recurrence, but she had been ill and had had severe epistaxis. She died on April 28, 1900, after severe vomiting persisting some thirteen hours. There was no *post-mortem* examination.

Conjunctival Bridges and Pouches.—Major Harold Herbert, I.M.S., Bombay, sent a paper on this subject, which was read by the Secretary. He reported seven cases of a rare condition, for which the term "conjunctival bridges" was considered suitably descriptive, in which, as a very unusual result of conjunctivitis, a fold or band, under which a probe could be passed, ran from the fornix to the lid. There might be two or even (in one case) three of these bridges in one eye.

In most of the cases there was distinct evidence of trachoma, but in no case any history of injury. The greater frequency and extent of the adhesions found in the upper lid evidently had some relation to the much greater expanse of the upper reflexion of conjunctiva, from which, during inflammatory attacks, swollen folds might hang down as tongues of tissue between the upper lid and the eyeball. Two cases were observed during an attack of conjunctivitis, with the folds actually in process of formation and bleeding when separated. He attributes the not infrequent occurrence of these conjunctival conditions in India to the prevalence of severe trachoma and to the large number of cases of untreated and ill-treated inflammations.

He also considers that much of the so-called "retraction of the fornices due to scarring" is due to the development of these folds, and instead of the bridge-formation persisting, to the complete union of the fold with the underlying conjunctiva.

In a similar manner it may also account for some of the cysts found in the fornices together with scarring.

Sympathetic Ophthalmia Fifty three Days after Enucleation.—Mr. Sydney Stephenson related a case in which a boy of 7 met with an accident, by which a dirty steel pen nib was accidentally thrust into the left eye. On his admission into the hospital the iris was found to be prolapsed through a small wound in the anterior part of the ciliary region. The piece of protruding iris was cut away and for some days the eye appeared to be doing well; but the tension then began to fall, the globe became congested and an inflammatory exudation into the vitreous was noticed. *Twenty days* after the injury the eye was enucleated, no signs of irritation of the other eye being then present. *Fifty-three days later* the patient came to the hospital with the right eye showing ciliary redness; atropine displayed several posterior synechiæ, and a few spots of keratitis punctata were found, while the O.D. was hazy on the inner side. After vigorous treatment with pads and atropine locally, and the internal administration of mercury, perfect recovery resulted with V. $\frac{6}{6}$ and J. 1, the pupil normally active and regular in shape.

Mr. Stephenson expressed his opinion that this case tended to prove that, if sympathetic ophthalmitis came on subsequently to enucleation, it was likely to be of a comparatively mild variety, and referred to the report of the Committee of the Society in which out of thirty cases eighteen recovered, in three the recovery was more or less incomplete, and in nine the eye was lost.

After the ordinary meeting the General Meeting of the Society for election of officers, &c., was held, at which it was announced that Professor Fuchs of Vienna, had accepted the Society's invitation to deliver the Bowman Lecture next year; also that the President had consented to act as the Delegate of the Society at the Congress on Tuberculosis, to be held in London during July.

ERRATUM.

EXTRA PHARMACOPŒIA.—In the review of this book, on page 199, the new edition was described as the fourth. This is an error, which the Editor regrets; the new edition is the tenth.

THREE OPERATIONS OF CATARACT EXTRACTION IN SEPTIC CONDITIONS.

By Freeland Fergus, M.D.

Surgeon, Glasgow Eye Infirmary.

The operation of cataract extraction is under modern conditions an operation so easy that in the vast majority of cases it causes the surgeon little anxiety. The percentage of failures is extremely small. From time to time, however, accidents happen, disappointing alike to the patient and to the operator. Thus some cases are still complicated with post-operative inflammation, which is probably always of septic origin, and which generally speaking could, by a thorough bacteriological examination, have been foreseen and prevented. Other accidents occur of which the surgeon cannot have any fore-warning. The most disastrous of these is intraocular hæmorrhage; while under the same category must be named escape of vitreous, with subsequent separation of the retina. Rarely does the patient succumb after cataract extraction, and as I have lately seen such a case it seems to me desirable to place it fully on record. I have only heard of two similar occurrences in the practice of other ophthalmic surgeons.

The patient was an elderly lady, somewhat feeble, but who in the main enjoyed good health. There was cataract, fully formed in the left eye, and incipient in the right. The pupil of the left eye responded well to light, and the field of vision and the projection were found to be normal. Following my usual practice in such cases, I had cultivations made from the conjunctival sac, and also examined the nose.

Bacteriological examination showed that the conjunctival fluid contained the bacillus xerosis, but was free from any pyogenic micro-organisms. The left nostril was found to contain a large polypus; it seemed, however, to be free from any discharge. To make matters, however, as certain as possible, the patient was sent to a surgeon for the purpose of having the condition of the nose remedied. The gentleman to whom she was sent, however, thought that the nasal affection might stand till after the cataract had been removed. Accordingly I agreed to operate, and on June 5 the lens was removed by superior section combined with iridectomy. In making the section a large conjunctival flap was cut. The operation was altogether normal. The dressing (sterilised cotton wool) was changed on June 6, when the eye was found to be perfectly well, the lids were normal, there was no secretion and there was no pain; the temperature since the operation had been sub-normal. While changing the dressings, I observed that there was a quantity of pus escaping from the left nostril. Considering the extremely healthy condition of the eye I confess that this circumstance caused me some surprise. Directions were given that the nostril should be syringed out thoroughly with tepid boracic lotion every few hours.

On June 7 the following note was made: "Eye is very quiet and wound practically healed. There is a good deal of cortical matter in the pupil and a little blood in the anterior chamber." Atropine was used, and it was found at the dressing next day that the pupil had reacted freely and well. There was still some pus coming from the nostril, but much less than on the previous day.

On June 8 the condition of the eye was highly satisfactory and there was almost no pus from the nostril. I left Glasgow on the 8th and returned on the morning of the 10th, but on the 9th the patient was visited by my assistant who found everything perfectly satisfactory ; up to this point the temperature had remained normal or even sub-normal, and the report of the 9th shows that the patient was remarkably well.

On my return on the forenoon of June 10 I found that in the early morning the patient had had a severe rigor. She was feeling weak and ill, had not been able to take breakfast and complained of pain in the head. The pus had stopped coming from the nose and the eye looked perfectly well. The pupil was well dilated ; the conjunctiva was only slightly red ; the cornea was perfectly clear.

Considering the healthy condition of the eye and the amount of pus which was escaping from the left nostril, it seemed obvious that there must be a purulent condition of one of the cavities in the neighbourhood of the eye.

On the night of June 10 the conjunctiva became distinctly swollen ; the cornea and media so far as they could be observed were perfectly clear, and the temperature was 99°. The pulse was about 84, regular and full. The patient complained of pain chiefly in the head and to some extent in the eye.

A thoroughly competent nurse was instructed to wash out the conjunctival sac every three or four hours with sterilised lotion, and to dress the eye with sterilised cotton.

On visiting the patient on the morning of June 11 I found that she had passed a restless night, that there had been vomiting at 6 a.m., and that she had complained considerably of pain in the head. The conjunctival condition had improved and there was much less discharge from her nose. The temperature was at the time of the visit 99°, and the evening temperature on the 11th was 99·4°

June 12 was passed by the patient fairly comfortably; the morning temperature was 98·4° and the evening 99·2°. Matters remained much in this condition till June 16, when I made the following note in the Journal: "There has since last night twice been a slight incoherence of speech, once at 4 o'clock this morning, and again at noon to-day. The temperature is steady at about 98°; pulse running about 88." The condition of the eye was found to be quite satisfactory. On the night of June 16 she became slightly delirious, and on the morning of the 17th at 2 a.m. the temperature rose to 100·6° and the pulse became irregular.

During this time the patient had taken nourishment freely, she had also a fair amount of stimulant and was now put on quinine. It was obvious alike to myself and to a physician whom I asked to see her that the patient was suffering from septicæmia.

On the 17th patient was very drowsy and could only be aroused with difficulty. Everything was passed in bed. During the day of June 18 she was much more conscious and seemed a good deal better, although the pulse had become very irregular. During the evening of the 18th the temperature rose to 101°; in the early hours of the morning of the 19th it fell very rapidly and she expired about 6 a.m.

Fortunately, permission was obtained to have a *post-mortem* examination of the head. This was done by Dr. Alexander Ferguson, assistant to the Professor of Pathology in the University of Glasgow, and the following notes of the autopsy are supplied by him:—

REPORT OF POST-MORTEM EXAMINATION IN CASE OF MRS. M.

The head only is examined. The conjunctiva of the left eye is injected, and there is a slight amount of turbid secretion towards the inner canthus. The cerebral membranes present a normal appearance, but there is slight fluid effusion into the pia-arachnoid.

The brain substance generally is moderately œdematous, but beyond this nothing of morbid import is observed in it. The orbit itself, as well as the fatty connective tissue surrounding it, is free from pus.

The left nasal fossa is carefully opened into from above, and a small quantity of thin yellowish pus is encountered here. The precise limitation of the pus is difficult to ascertain, but it has been mainly, if not entirely, confined to the superior part of the left nasal fossa. The nasal chamber is, on exploration, found to be occupied by two or three polypi; the largest of these, possessing a fairly long, thin pedicle, and of the size of a damson stone, but spherical in shape, blocks the nasal fossa about the level of the middle meatus. This polypoid outgrowth is very dark and congested, and has a small quantity of pus on its surface. The sphenoidal sinus of this side contains a small quantity of pus, but its presence in the frontal sinus is not definitely determined.

The larger polypus referred to above appears to have obstructed the nasal fossa, shutting off the upper part consisting of superior and middle meatus with communicating sphenoidal sinus, and pus, in all probability the result of ulceration of the mucous membrane, associated with the presence of the polypus, has been pent up behind the obstruction. It must be added that portions of the superior and middle turbinate bones, after removal, are found completely bare, and showing in places minute areas of superficial erosion.

(*Signed*) ALEC R. FERGUSON.

Two cases of a somewhat similar nature, but which had a very different result, seem to me worthy of record as a contrast to the preceding. Both had fully-matured cataract in one eye and incipient in the other. One case suffered from chronic dacryocystitis, a considerable amount of pus coming from the lacrimal sac on pressure. The other had a purulent condition of the antrum of Highmore, with a septic condition of the conjunctival sac. This latter case was complicated by nasal polypus.

Mrs. B., a middle-aged, healthy woman, had, as already said, fully-formed cataract in her left eye, with incipient cataract in the right. On account of her having dacryocystitis, a surgeon whom she consulted had refused operation so long as the sight of the other eye was sufficient for the ordinary purposes of life. For some time back the right eye had been failing, and it had therefore become a matter of some moment to have the left eye rectified.

The usual method of treating such a condition is by passing probes and syringing out the sac and lacrimal passages. Twice after such preliminary treatment I have, in similar circumstances, successfully extracted cataract. Yet few surgeons will trust to such methods for the thorough cleansing of the eye. In a very large number of cases the condition of the lacrimal sac is scarcely improved by washing and probing, and there is little hope of such remedies rendering the parts sufficiently aseptic as to admit of a successful operation for cataract. Under these circumstances it occurred to me that the method which was best adapted to the case was the removal of the lacrimal sac; that seemed the only method of getting rid of the septic focus. In ordinary circumstances when the sac is removed there is surprisingly little resulting epiphora, and hence I thought it worthy of trial in this case, all the more so that after the operation of cataract extraction most of the drainage is to the dressing.

Accordingly, on June 6 the patient was put under an anæsthetic, and the sac was removed. To facilitate the operation a large-sized probe was first passed. A vertical incision was made internally to the inner canthus, the dissection was continued till the probe was exposed, and the sac was removed by means of scissors. The wound was closed with catgut sutures.

The recovery from this part of the operation was rapid and in every way satisfactory. The sac was completely obliterated, and no sinus or very obvious cicatrix left.

From the first there was observed to be a good deal of discharge from the conjunctiva on the same side. So soon, therefore, as the parts had recovered from the first operation, treatment was adopted to remove the conjunctivitis. So from June 16 onwards the eye was thoroughly syringed with a weak solution of bichloride of mercury. The washing was done twice daily till July 4, by which time bacteriological investigations showed that there were no pyogenic micro-organisms in the conjunctival sac.

On July 4 the lens was extracted, the operation being combined with an iridectomy. On the 5th the eye was dressed, and again on the 6th, when the following note was made : "On dressing to-night the eye looks perfectly quiet. There is only a slight mucous discharge on the old dressing but no pus. Patient has had no pain whatever in the eye. The pupil is tolerably well dilated although no mydriatic has been used."

The progress was quite uninterrupted till July 18, on which day she was dismissed with excellent vision.

More nearly allied to the case of Mrs. M. is that of Mr. C., aged 74. He had fully-formed cataract in the left eye and incipient cataract in the right. On examination there was found to be a slight conjunctivitis of both eyes, affecting chiefly the palpebral conjunctiva and the retro-tarsal fold of each eye. On examination the pyogenic micro-organisms were obtained from the conjunctival fluid. In addition, a large polypus was observed in the left nostril. There was also found to be some discharge from the nostril, which I thought was probably coming from some cavity near the nose.

On June 26, Dr. Brown Kelly diagnosed pus in the antrum. He removed the polypus, perforated the alveolar border, and removed a large quantity of pus.

From that date till July 8 the antrum and conjunctival sacs were washed out with sterilised water every few hours.

Cultivations taken on July 4 showed that there were no longer any pyogenic micro-organisms in the conjunctival fluid. Therefore, on the 8th the lens was extracted. The operation was combined with an iridectomy, and a large conjunctival flap was cut. The lotion used during the operation and subsequently at each dressing was normal saline. Recovery was excellent, and he was dismissed on July 18 with excellent vision.

In connection with these cases two points seem to me to be of special importance. I think (1) they illustrate the desirability of bacteriological examination before an operation is performed; and (2) they show the necessity of a thorough examination of the cavities in the neighbourhood of the orbit. For years past I have always, prior to operating for cataract, had a bacteriological examination made. Not infrequently pyogenic micro-organisms are found in the conjunctival fluid, and that without any accompanying marked conjunctivitis. Particularly is this true with certain forms of streptococci. From one patient I received an instructive lesson in this respect. She had been operated on for cataract by another surgeon, and acute panophthalmitis at once set in. I was asked to do the other eye, but before operating a thorough bacteriological examination was instituted. It was found that the staphylococcus aureus was present in the conjunctival fluid of each eye. That entirely explained the suppuration of the first eye and I have no doubt that if I had at once operated on the second eye there would have been a like result.

That the cavities in the neighbourhood of the eye should also be thoroughly examined before operation did not occur to me till the case of Mrs. M., although, like all other ophthalmic surgeons, I have always carefully enquired as to the condition of the lacrimal apparatus. Antiseptic surgery, so far as the eye is concerned, is impossible. No germicide has yet been discovered which can be applied to the human conjunctiva and cornea in germicidal strength without at the same time destroying, or at least impairing these membranes. A solution of bichloride of mercury (1—1,000) is said to take twenty-five minutes to kill the staphylococcus aureus. What possible germicidal effect can there be from a short irrigation with a solution 1—8000 just before operation ? If any benefit is derived from such a process it must be purely mechanical.

But if antiseptic surgery is impossible, an aseptic condition may in great measure be obtained, and the examinations here indicated are for this purpose essential.

A NOTE ON HOLOCAINE.

By Frank C. Crawley, M.D.Univ.Dubl., F.R.C.S.I.

Having read with much interest some time ago a paper[1] by Dr. Hinshelwood on the subject of holocaine as used in ophthalmic practice, I think the following note may be of some interest.

I obtained some time ago from Messrs. Hunt & Co., chemists in this city, one ounce of a 1 per cent. solution of holocaine. Half of this ounce I put into what is known, locally at all events, as a "Chalk's drop bottle;" that is, one with a hollow glass stopper, the top of which is covered with rubber, so that a vacuum thus may be made by pressure on it, and the liquid drawn up into the stopper. The other half of the solution I left in the cork-stoppered bottle in which I had got it.

The half-ounce in the drop bottle remained in it for some two months or so, being used now and then. I noticed no decrease in volume of the liquid beyond what would be accounted for by its occasional use.

One day, having to remove a foreign body from the cornea of a patient who objected to the mydriatic effect of cocaine, I used some drops of the holocaine. Next day my patient came back and told me that his pupil had been dilated for some two hours after he had been with me.

In two more cases I tried the holocaine, and found that undoubtedly it did act as a mydriatic, the effect commencing about fifteen to twenty minutes after instillation, and lasting two or three hours.

Making control experiments with the *same* dropper, but using the original solution which had been kept in the cork-stoppered bottle, I found that this solution had no mydriatic effect whatever, yet otherwise behaved as holocaine should do.

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[1] Ophthalmic Review, July, 1898.

Then, through the kindness of my friend, Dr. Werner, of the Chemical Laboratory, Trinity College, Dublin, an exhaustive analysis was made of the two solutions. The one contained in the drop bottle was found to be a 20 per cent. solution of holocaine, probably due to evaporation, and the original one in the cork-stoppered bottle was a solution of 1 per cent.

It might be well to add that the 20 per cent. solution was little, if at all, turbid.

This occurrence would certainly seem to show that holocaine, toxic as it undoubtedly appears to be hypodermically, may be dropped freely into a conjunctival sac in a 20 per cent. solution without any untoward symptoms arising, save a transient mydriasis, but (I need hardly add) without any advantage over a 1 per cent. solution.

REVIEWS.

A. POULARD (Paris). Paralysis of the Associated Movements of the Eyes. *Archives d'Ophtalmologie, May*, 1901.

Peripheral paralytic affections of the eye muscles are very common, and nuclear lesions are not uncommon, but paralysis of the associated movements is a decidedly rare condition, especially in some of its forms, or perhaps it may be that it escapes observation more frequently than should be the case. One may say there are six forms of this type of paralysis, since the associated movements to which the author makes reference are six, in all of which the eyes maintain their equality of excursion—movements to right and to left, movements upwards and downwards, movements of convergence and of divergence (if we for the meantime take it for granted that there is such an innate movement as active divergence). In the first four the visual axes remain parallel, in the last two they cease to be so. Of the paralyses of these movements that of lateral movement is by far the most frequently observed — the "conjugate deviation" so often noticed along with hemiplegia, and which may be due to any of several causes acting in various situations, is the most familiar manifestation; but it is to be remembered also that conjugate paralysis may occur without conjugate deviation, for the deviation is a result, but not a necessary result, of the paralysis. Paralysis of upward or of downward movement is vastly less frequent, particularly the latter, but paralysis of the two combined has been recorded a few times.[1] It is to paralysis of downward movement pure and simple that Poulard chiefly devotes his attention meantime. After brief notice of three cases by Priestley Smith, Schroeder, and Babinski, he relates one of his own, of which we may give the following account:—

A man, aged 60, had an apoplectic stroke with loss of consciousness for six hours, since which occurrence (a month before Poulard saw him) he had been unable to see anything "in its proper place." The "doubling" of objects it was which had necessitated his seeking advice. On examination, there was no obvious strabismus, it was the double vision alone which enabled one to observe the insufficiency of certain of the muscles. When the head was held erect the patient could move the eyes upwards, to right and to left, but downward movement was practically completely absent. Nor could either eye by itself execute the movement any better. Convergence was distinctly less ample than it ought to have been. As to the diplopia which existed, and which did not vary even on repeated examination, it was crossed and confined to the right side of the field of fixation, the lateral separation of the images increasing as the object was moved to the right. This was due no doubt to an insufficiency of the left internal rectus, but in addition there was a vertical diplopia, the images becoming further separated in the vertical sense as the object was raised; the higher image belonged to the left eye, but as it in no position showed any inclination, Poulard says he was unable to decide that it was due to paresis either of the superior rectus or the inferior oblique, and thought it must be regarded rather as an insufficiency of the function of elevation of the left eye. This may well be so, but one would have been more convinced of it had he stated that the vertical separation of the images was equal all over the upper field, for this is a much more reliable test as between the two muscles than that based upon the torsion. The patient's attitude, on descending a stair for example, was very characteristic, for he carried his head as much sunk on the breast as possible in order to try to compensate for the loss of downward movement of the eyes. On being asked to look at his shoes this attitude was very much exaggerated, yet he never succeeded in directing the gaze to them; in reading or writing the patient felt the same difficulty from loss of ability to move downwards. The pupillary reflexes to light were quite normal, vision was good, and the field of the proper extent; accommodation, of course, was almost nil.

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[1] See for example OPHTHALMIC REVIEW, 1901, p. 189.

It is at once obvious that no muscular or peripheral nerve lesion is capable of producing these symptoms; an alteration of the nuclei grouped along the aqueduct of Sylvius and the floor of the fourth ventricle, or of the commissural fibres running between these on the two sides, might perhaps do so. It is, however, improbable that such a lesion could have picked out certain of these nuclei or of their connecting fibres without implicating others also, since they are practically in close contact, though such is of course not impossible. For this reason, though not altogether denying the possibility of a nuclear origin for the symptoms, Poulard is in favour of the theory of a lesion in the co-ordinating centres of the ocular movements or in the fibres connecting them with the nuclei. It seems certain from clinical as well as from experimental evidence that movements of the eyes may be initiated in several different areas of the cerebrum, and irritations of the cerebellum may have a similar effect. Hitzig found that if one places the electrodes behind the ears in man, vertigo is produced, and the head and eyes are turned towards the positive pole, while external objects appear to turn the opposite way, viz., towards the negative pole. Irritation of the middle cerebral peduncle also may cause ocular deviations. According to Laborde and others, it is the inferior vermiform process of the cerebellum which presides over ocular movements, but it appears to be the case that while stimulation of the cerebral cortical areas in question give rise to conjugate deviations, cerebellar irritation produces dissociated and strabismic alterations, and that a lesion of the cerebellum may cause the abolition of associated movements. The opinions here expressed are thus seen not to be precisely in accord with those of other authors on the intricate subject of the exact functions of the cerebellum.

By reason of the extremely complex and intimate relationships in which the nuclei of the motor nerves of the eye stand to one another, each of these nuclei becomes in a sense itself a co-ordinating centre for movements which are practically never performed by one muscle alone, but by an association of two or more; yet while this is so, and while, therefore, it might be possible to explain such a paralysis as that of downward movement on the assumption of a nuclear lesion, it must be recognised that clinical evidence from other cases is not in favour of such a suggestion. Certain other centres must exist in the mesencephalon which have the function of connecting the various nuclei of origin and of directing their combined action in the production of associated movements. For these centres Raymond proposed the name of "extra-nuclear," by way of differentiating them from the true nuclei of origin in and about the floor of the fourth ventricle. The cortical centres, on the other hand, are named "supra-nuclear" to indicate that they are not in the mesencephalon, but superior to it; they are higher centres than either the nuclei or extra-nuclei.

It is in the corpora quadrigemina that these extra-nuclear centres are situated, or in their immediate neighbourhood: it has long been known that they had important functions in connection especially with reflex movements of the eyes. Stimulation of the right anterior corpus causes conjugate movement to the left; stimulation applied in the middle line between the two anterior causes convergence; if the eyes have been previously directed downwards and diverging, stimulation of the posterior commissure brings them back to line; stimulation in the middle line behind causes elevation of the eyes, and of the inferior external portions, depression of the eyes. The few pathological cases which bear upon the question seem also to bear out these experimental conclusions. Thus, for example, Bergerhof recorded a case of paralysis limited to the internal rectus and the levator in a case in which *post mortem* a tubercle was found limited to the right half of the corpora quadrigemina. The objection to this opinion that in some of such cases the corpora quadrigemina were intact, he escapes that by saying that, even if the centres were unaffected, the paths conveying the impulses may have been "caught," and we do not precisely know by what route these reach their destination in the aqueduct and fourth ventricle. Very recently (*Revue neurologique*, January, 1901) Raymond described a case in which the *post-mortem* appearances were very interesting. There had been paralysis of lateral conjugate movement, and he found a tubercular lesion nodule mesially situated in the upper third of the pons, which during life had not invaded either the corpora quadrigemina or the sixth nucleus. The mass lay between the nuclei of the third and of the sixth, injuring probably those fibres which run from the one of these nuclei to the other; he does not on this account by any means reject the theory of the co-ordinating function of the corpora quadrigemina, he only expresses a little doubt whether those very important uniting fibres which bind together the nucleus of the sixth with that of the third travel directly by the posterior longitudinal bundle, go straight from sixth to third, or in the first instance run from the sixth nucleus to those co-ordinating centres which lie in the immediate neighbourhood of the corpora.

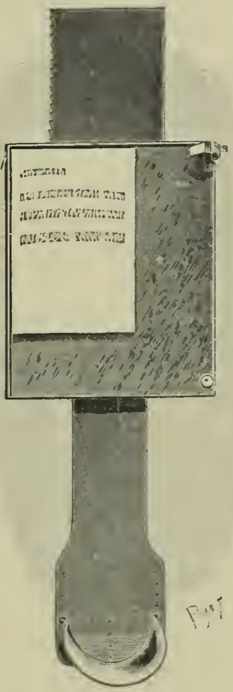
To sum up, Poulard supposes the following arrangement of the nerve mechanism for the associated movements of the eyes:—The nuclei of origin of the nerves; co-ordinating centres which regulate these associated movements; extra-nuclear centres, apparently charged with the regulation of reflex binocular movements; supra-nuclear centres which preside similarly over the association of voluntary binocular movements; and the cerebellar centres, whose function probably is to maintain the relationships and ensure the equilibrium of the visual axes.

In the light of this scheme, where, he asks, is the lesion most probably situated in the case narrated by himself? A nuclear lesion, acting upon the nuclei of origin of the motor nerves, is no doubt capable of explaining the condition, but, as indicated above, there are clinical and anatomical difficulties in the way of the acceptance of a nuclear site. Besides, one of the fundamental characters of nuclear lesions is that they are not associated or conjugate. An extra-nuclear situation is more probable, in the region of the corpora quadrigemina, either in the centres of association of conjugate binocular movements themselves or in the fibres running between these and the lower nuclei. It is also possible that the lesion might be supra-nuclear, in a cortical or subcortical situation. There are, perhaps, hardly sufficient other nerve symptoms present to enable one to come to any definite conclusion, but the fact of the coincident occurrence of other dissociated paralyses seems to point to the probability of the lesion being extra-nuclear.

W. G. S.

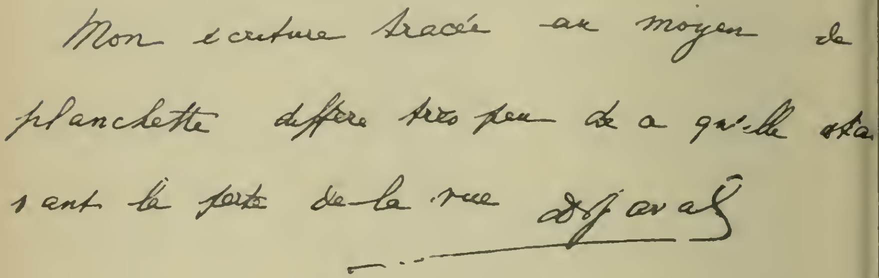
E. JAVAL (Paris). A Writing Apparatus for the Blind. *La Nature, May* 18, 1901.

At a recent meeting of the French Academy of Medicine, a communication of very unusual and pathetic interest was made by Dr. Javal. During the year 1900 this well-known scientist, to whom ophthalmology owes so much, became completely blind through glaucoma. Some years previously this disease had caused the loss of one eye, and has now, in spite of protracted treatment, destroyed the second also. Not deterred by this calamity, he has lately set himself, so far as may be possible, to neutralise for himself and others the incapacity for useful work which blindness, occurring in adult life, too often brings with it.



The first outcome of his courage and ingenuity in this direction is an apparatus by means of which he is able to continue a large correspondence with his own hand, and which will unquestionably be of great value to others suffering in the same way.

The adult who becomes blind is usually able to recall the movements of the fingers and thumb which he has habitually used in writing, and to produce characters differing little from their habitual form. His difficulties are to maintain parallelism between the lines and, having finished one line, to begin the next at a proper distance. The writing board invented by Javal is based on the principle of making the elbow a fixed point around which



Mon écriture tracée au moyen de
planchette diffère très peu de ce qu'elle éta
vant la perte de la vue
E. Javal

the hand moves in short parallel arcs of a circle. At the lower end of the board is a metal pocket in which the elbow rests, and at the upper end is a movable slab upon which the paper is fixed. The distance of the paper from the elbow pocket is regulated by a series of notches, by means of which the writer, having finished one line of writing, can move the paper carrier into the proper position for the next. Another difficulty which a blind writer encounters is that if he uses a pencil the point is soon worn and the writing blurred, while if he uses a pen or stylograph the ink may fail to run and he may continue laboriously to write for a long while with no result. Javal overcomes this difficulty in an ingenious way. Fixed to the upper right hand corner of his board is a long narrow strip of tissue paper rolled up like a tape. At the end of each line the writer pulls out the end of this paper ribbon and draws his pen across it. If the ink flows, the paper is moistened and tears with the slightest pull; if it fails, the paper remains dry and does not tear.

The accompanying illustrations show the apparatus, which is made by Giroux, 19, Rue de l'Odéon, Paris, and a specimen of Dr. Javal's writing effected by its means.

It will be readily understood that Dr. Javal's communication, presented by himself to the Academy of Medicine and handed to the President in the form of a well-written manuscript from his own hand, was received by his colleagues with an ovation strongly expressive of the sympathy which they felt for him under his calamity, and their admiration for his determination to pursue an active and useful life. It will arouse the same feeling among his professional brethren in this country. P. S.

HENRI COPPEZ (Brussels). Interfascicular Endothelioma of the Choroid. *Arch. d'Ophtal., January, March*, 1901.

Continued from p. 223.

Critical and Biographical Review.—A brief examination of the published descriptions of neoplasms of the uveal tract suffices to show that a precise classification of these tumours is impracticable. This is mainly due to the absence, in the records, of those features of the new growth which are chiefly valuable in microscopic diagnosis.

Round-celled and spindle-celled sarcomata are easily recognised, but the determination of alveolar sarcomata, peritheliomata, and interfascicular endotheliomata is less simple. The difficulty is increased by the alveolar structure which these growths so frequently assume. Metastatic carcinoma, by reason of its lobular arrangement, has also led to confusion, and several cases described as alveolar sarcoma were in reality metastatic carcinoma. The alveolar form of interfascicular endothelioma has more especially been looked upon as carcinoma, in consequence of the relation of the new tissue, in both varieties, to the blood vessels.

There is another difficulty in the differential (microscopic) diagnosis. The connective tissue strands of these alveolar tumours almost always enclose a central vessel; in the smaller strands the connective tissue may almost entirely disappear, leaving the vessel unsupported. In tumours which spring from the perithelial cells of the vessels and extend along the latter, the vessels are shown as forming the whole or part of the strands; in interfascicular endotheliomata, also, the new growth may be in close and direct relation to the blood-vessels. Moreover, proliferation in the tumour elements always leads to proliferation of blood-vessels. These latter multiply so rapidly that the connective tissue growth cannot keep pace with them, and the newly-formed capillaries are thus brought into intimate contact with the neoplastic cells, although in their origin they have nothing in common.

In the parts of a tumour most highly developed the diagnosis will often be difficult, and the true nature of the growth may remain undetermined. It is precisely such portions which, having a more or less characteristic appearance, attract attention, and are described or reproduced in drawings. The extreme periphery of a growth is the part which should be studied. Here alone can we distinguish with certainty whether the tumour springs from perithelial cells and grows round the vessels, or from the endothelium of lymph spaces.

In his criticism of previous records Coppez divides the cases into four groups :—

(1) Interfascicular endothelioma described or recognised as such.

(2) Interfascicular endothelioma published under other titles.

(3) Tumours described as endothelioma which are not interfasicular endothelioma.

(4) Tumours described as primary epithelioma of the uveal tract.

In the first group he quotes six cases, only one of which was designated by the author endothelioma. The others were reported as alveolar sarcomata of various kinds, but Coppez, from the description and illustrations, judges them to have been endotheliomata.

In the second group are placed five cases (Nos. 7 to 11). No. 7 recorded by Alt as alveolar intraocular sarcoma, with formation of cartilage, was that of a child aged 8 years, in whose right eye a tumour of the ciliary body developed. Its removal was rapidly followed by local recurrence. Coppez believes the growth to have been an endothelioma of the ciliary body.

No. 8, also by Alt, was entitled " Sarcoma of the Choroid, with formation of cartilage "; Coppez reads Alt's report as a good description of an endothelioma, which had undergone some chondro-myxomatous degeneration.

Nos. 9, 10, 11, are reports by Pagenstecher and Genth, Hill Griffith, and Panas and Rochon-Duvigneaud. These cases Coppez is inclined to class as endotheliomata, but does not feel sure as to their nature.

In the third group four cases are included, which in Coppez's opinion are not examples of interfascicular endothelioma, although the published description of the microscopic character is suggestive of this form of new growth.

The fourth group, comprising tumours described as primary epithelioma of the uveal tract, is that to which Coppez devotes most attention. In it he includes 16 reported cases. In the early part of this paper he drew attention to the close resemblance between endothelioma and glandular carcinoma, adenoma and epithelioma. Of late years several cases have been recorded of primary epithelial tumours of the uveal tract. There are reasons for questioning whether these neoplasms are really epithelial in origin, or are tumours springing from connective tissue.

Some of the observations are very brief, and the cases have not been followed sufficiently long to exclude the possibility that the ocular tumour was secondary to an undetected visceral carcinoma. In others the course of the disease seems too slow for a glandular carcinoma.

Recurrence after removal of the eyeball has been exceptional. In sixteen cases, only one is recorded in which recurrence of the tumour took place, a percentage which is too low for tumours so malignant as epitheliomata.

In the pathological anatomy of these cases there are points which merit attention.

The tumours may be divided into two groups. In the first are growths of very small dimensions, limited to one ciliary process; in the second group are the larger growths, and the most striking feature in the descriptions of these tumours is their polymorphism. Thus in one specimen (No. 18) there are described parts of the tumour presenting the characters of adenoma, others of epithelioma, others of encephaloid carcinoma and others of sarcoma. In another specimen, No. 19, sarcoma cells are described adjoining adenomatous tubules. These mixtures, Coppez adds, are to say the least, remarkable.

The drawings of some of the tumours, in Coppez's opinion, will bear an interpretation different from that given by the author of the case.

Some writers maintain that the new growth springs directly from the posterior epithelium of the iris (Hirschberg and Birnbacher), or from the cylindrical cells which continue this layer backwards to the ciliary body (Badal and Hanke). Others accept their own diagnosis with reserve, Hirschberg and Birnbacher remarking that it would scarcely appear possible, on morphological grounds, for a primary carcinoma to develop within the eye except from the cells of the anterior lens capsule.

Treacher Collins, who described glands in the ciliary processes, considers adenoma in this region in no way unusual, but rather as furnishing pathological evidence of the existence of gland structures. Lagrange and Badal support Collins' view of the presence of glands, while Nicati strenuously opposes it. Birnbacher and Terrien have failed to find structures to which the term gland is applicable. Coppez thinks from evidence before him, that the existence of the glands of the aqueous humour has not been proved, and that therefore the epithelial nature of certain tumours (which has been considered an argument in favour of Collins' views) may well be called in question.

The presence of a connective tissue tumour, sarcoma, perithelioma or endothelioma, which has developed an alveolar or tubular character, offers a ready explanation of the so-called epithelial new growths. It explains the polymorphous features of these tumours, their benignant character compared to encephaloid carcinoma, the slowness of their growth, the comparative growth of the subjects of them, &c.

The suggestion that the so-called epithelial tumours may be in reality tumours of the connective tissue group is not new. More than one of the writers whose cases Coppez criticises express this opinion.

In summing up his observations upon the sixteen reported cases which make up his fourth group, Coppez gives it as his opinion that no case of *undoubted* primary intraocular carcinoma has yet been recorded.

His conclusions are as follows:—In the choroid and the ciliary body are found sarcoma and allied tumours (perithelioma, endothelioma) which spring from the perithelial cells of the vessels, the endothelial cells of the lymph spaces, and the proper cells of the uveal tract tissues. Almost invariably these tumours take origin at several points, and from varying cellular elements. It is from the particular structure which undergoes most proliferation and from the general direction in which growth chiefly occurs, that the precise variety of new growth can be determined.

Of these neoplasms, interfascicular endothelioma exhibits the highest degree of polymorphism, and numbers of tumours described under other names are in reality endotheliomata.

Coppez's paper is obviously based upon a thorough study of the subject upon which he writes, and although much debateable matter is included therein, his remarks are very suggestive and worthy of consideration.

J. B. L.

MELLER (Vienna). On Spontaneous Rupture of the Lens Capsule and Escape of the Lens Nucleus from the Eye. *Beiträge zur Augenheilkunde, June*, 1901.

When opacity of the lens developes after an iridectomy for glaucoma, must we necessarily assume that the lens has been touched by the knife? This is a question which has probably occurred to most operators, and the evidence which Meller here adduces to show that spontaneous rupture of the capsule may take place under such circumstances will be read with interest.

His first case was a man who was iridectomised on the fourteenth day of an attack of acute glaucoma, the operation being regular in its performance and successful in its result. But twenty-seven days later the eye became suddenly the seat of severe pain, which after lasting for several hours, as suddenly disappeared. The next day the patient presented himself at the hospital; the lens nucleus was found lying in the conjunctival sac, under the upper lid; the operation wound was gaping and vitreous was protruding from it. As the eye had only doubtful perception of light it was at once excised.

On making a sagittal section the edges of the wound were found to be composed of granulation tissue; the lens capsule contained some remains of lens matter; its upper part was pushed forward from the level of the ciliary processes to the region of the wound, and was here open, the torn edge of the anterior capsule lying close against Descemet's membrane, partly rolled up and embedded in granulation tissue, while the torn edge of the posterior capsule lay close behind, separated from it by a thin layer of granulation tissue. The retina was atrophic, the choroidal vessels engorged.

The second case was that of a woman, aged 64, with chronic inflammatory glaucoma, for which an iridectomy was done with a Græfe knife. On section of the iris some clear lens matter appeared in the wound, and on using the repositor there was some escape of vitreous. When she left the hospital twelve days afterwards the wound was not closed, the anterior chamber was very shallow, and the lens was opaque. Three weeks later she returned on account of pain in the eye. The anterior chamber was now deep; the pupil was filled with some streaky remains of lens, through which a yellowish-brown reflex from deeper in the eye could be seen; it was evident that the lens nucleus had escaped. The eye was removed, and on section the relations of the lens capsule were found to be practically identical with those found in the first case. But there was in addition a large retro-choroidal hæmorrhage, evidently of some standing, as it was partially encapsuled, which had given rise to the yellowish reflex seen behind the lens.

It seemed clear that in each case the lens capsule had given way at the equator at or about the time of operation, and that a slight escape of lens matter had hindered perfect adaptation of the lips of the wound and the way had thus been prepared for the escape of the nucleus from the eye whenever the tension became for any reason temporarily increased. No pressure on the eye had occurred in either case.

Meller finds only two similar cases recorded, which are here briefly recapitulated.

In one, operated on by Lesshaft for chronic inflammatory glaucoma, the edges of the wound were at first in perfect opposition, but began to gape more and more during the next six days. During the night of the sixth severe pain came on, which after lasting a while suddenly abated, so that the patient could sleep again. The next morning the lens was found squashed in the dressing. Lesshaft was able with great confidence to exclude any injury to the lens capsule at the time of operation.

The other, reported by Wicherkiewicz, was a case of glaucoma presenting unusual difficulties in consequence of unruliness of the patient, corneal opacities and extreme shallowness of the anterior chamber. The operation was however, completed without mishap. The operator expressly states that the tension of the globe was not reduced even at the time of operation, and he believed he could perceive after removal of the iris that the lens was slightly displaced towards the wound, but its capsule presented no sign of injury. The patient was coughing and restless during the day. The next morning the lens nucleus was found under the lid.

Meller thinks the essential factor in all these cases is increased tension in the vitreous chamber, either existing before the operation and unrelieved by it, or developing later. He has produced such a condition experimentally in animals by making an iridectomy and then injecting fluid into the vitreous. The lens tilts forwards round a frontal axis so that its equator presents in the wound; here, of course, it is unsupported, and a little further increase of pressure causes the capsule to split and give exit to the lens substance. The rupture appears always to take place at the equator, where in fact the capsule is thinnest, and it is thus distinguishable from an injury produced by the knife, which would be situated further forward, in the anterior capsule.

W. G. L.

The "Indian Medical Gazette," *June*, 1901.

The Editors of the *Indian Medical Gazette* have put into practice the idea adopted at times by other medical periodicals, of publishing one number of their Journal devoted entirely to a special branch of medical science and practice.

The June number of the *Indian Medical Gazette* is a "Special Ophthalmic Number," and contains a large amount of information which is of great interest to all ophthalmologists, and perhaps particularly so to those who do not know India, or the peculiarities of medical and surgical work there.

The text of the majority of the articles in the Journal before us is, as might be expected, cataract and its operative treatment. The vast experience in the treatment of cataract which surgeons in India gain, lends great weight to their opinions as to the methods by which the best, *i.e.*, the most generally satisfactory results are to be obtained. It is, however, only fair to add that strict comparison of the operation in this country and in India is scarcely possible, and would certainly be misleading. The disease is the same, but the subjects of it, and the conditions under which they live, are widely different from those in western climes. Moreover, judging by the expressions of opinion in the *Indian Medical Gazette*, the standard of visual acuity after operation may be decidedly lower in India than in this country and yet give satisfaction to the majority of the patients.

Perusal of the articles in the *Indian Medical Gazette* will quickly show that there are the usual differences, often in matters of detail only, between surgeons in India, as in this country. One important point which attracts attention, is that the writers appear to treat the conjunctival sac much more actively than is the case at home. For instance, one writer washes the conjunctiva with a 1 per cent. carbolic acid solution, and others with a solution of perchloride of mercury, 1 in 3,000 or 1 in 4,000. We may, perhaps, assume that this means that the conjunctiva of the natives of India is generally more septic than that of western peoples, and demands the employment of antiseptic rather than aseptic measures.

Space will not permit us to notice in detail the varieties of operation advocated by different surgeons, they form an interesting study, however, and are worthy of it.

Altogether we congratulate the editorial staff of the *Indian Medical Gazette* on their "Special Ophthalmic Number."

S. BAUDRY (Lille). Therapeutique Oculaire Usuelle. *Vigot, Paris*, 1901.

This is a little book of 160 pages or thereby, one of a series of such upon "spécialités," a volume of the "Manuels de Thérapeutique clinique." It in particular, and apparently the whole series as well, is particularly meant to be of use to the ordinary practitioner, to be a storehouse of just the pieces of information he is sure to need, sometimes at a moment's notice. This want is well supplied, for the work is carefully and sensibly written by an experienced hand, the advice is generally good, and the leading usually trustworthy.

G. HARTRIDGE. The Ophthalmoscope. *London: J. & A. Churchill. Fourth Edition*, 1901.

Mr. Hartridge's very useful little manual has now reached its fourth edition, a fact which speaks more strongly for the undoubted value which it possesses as giving in convenient form all which it is necessary for us to know, believe, and practise in regard to the groundwork of ophthalmoscopy than any review can do.

CLINICAL NOTES.

OPERATION FOR PTOSIS.—There are two great difficulties about any operation for ptosis, namely, to obtain sufficient effect without risk of causing exposure of the cornea too constantly, and to avoid a worse deformity than before. Fergus thinks that by adopting a method which he has devised these two difficulties may be avoided. He makes an incision along the eyebrow, where it will subsequently be quite invisible, lays bare the occipito-frontalis for about a couple of inches (in a child), and then separates skin and superficial parts from the orbicularis and tarsus down almost to the lid margin. This done, a flap of occipito-frontalis muscle is dissected up, about two inches long and nearly an inch wide, left attached only at its posterior extremity, drawn down, and fastened by catgut stitches as near the margin of the lid as possible. The skin wound is then united. He gives a photograph showing a very good result.—*British Medical Journal*, March 30, 1901.

IODOFORM IN ANTERIOR CHAMBER.—At the Utrecht Conference in 1899, Haab recommended the introduction of iodoform into the anterior chamber in cases of threatened suppuration, a method which Ostwald had first applied to the lower animals. Goldzieher (Budapesth) has recently employed this means of treatment, using it in the first place in cases in which no other treatment was likely, in his judgment, to be of much avail. In the first of the five cases which he records he introduced the little rod of iodoform in order to study the reaction of the eye to it, rather than with any idea of checking suppuration. It was a case in which a man received a penetrating injury from a piece of metal; this was removed with some difficulty and iodoform introduced into the anterior chamber. Though dirt was hanging about the lips of the wound and probably was carried into the wound, no septic infection occurred, but the blood was quickly absorbed from the anterior chamber, and the eye quieted down quickly. In three of the other cases at least pus was present but was rapidly absorbed, and even if the eyes might have healed up without (though he does not believe they would), or if the favourable turn which they took might be ascribed to the emptying of the anterior chamber, he considers that the relief from pain experienced is of itself quite sufficient to justify so simple a measure. He thinks it probable, too, that the opaque area remaining in the cornea has been less in those cases than it would otherwise have been, although, probably from the action of iodoform upon the endothelium, a pretty large semi-transparent nebula remained for a long time.—*Centralblatt für Augenheilkunde*, March, 1901.

IMPROVEMENTS ON SIMPLE ENUCLEATION.—None of the various means hitherto suggested with the object of securing a more elegant result than is given by simple enucleation seem to Lagrange satisfactory; they either cause too much reaction, or the graft shrinks into nothing, or the globe implanted is expelled, too frequently for confidence to be placed in the eventual result. He himself has tried, among other things, the head of a rabbit's femur, both in its ordinary state and decalcified, but (as indeed he might have expected) it was either cast off or gradually eaten up. Lately he has experimented with the entire eye of a young and healthy rabbit implanted in Tenon's capsule. Over it the straight muscles are united in pairs and the conjunctiva sewn fairly closely. So far he seems to have had only four cases, in one of which there had been panophthalmitis, which made it a totally unsuitable case, one would have thought, for any such attempt, and the immediate reaction was of course very severe. In another the rabbit employed was much too old, and its tissues, therefore, not well adapted for transplantation, but in the other two the eventual result was good. The attempt is interesting, but the method is not in the least likely to come into general use.

Rohmer (Nancy) reports favourably of the plan of injecting into the tissues of the orbit, about two to three weeks after enucleation, a cubic centimetre of warmed liquid vaseline. This, he says, gives a great improvement in the position and mobility of the artificial eye. The vaseline seems to remain a long time without either being absorbed or causing any reaction, but just how long it will do so it is not yet possible to say. — Rohmer, *La Clinique Ophtalmologique*, February 25, 1901; Lagrange, *Annales d'Oculistique*, March, 1901.

THE VARIETIES AND TREATMENT OF "AFTER-CATARACT."[1]

BY F. RICHARDSON CROSS, BRISTOL.

AFTER the extraction of a lenticular cataract, there will always remain some fragments of altered lens or capsule, as a record of the operation. The pupil may be black and clear, and the sight, with the help of correcting spectacles, practically perfect; or on the other hand, the pupil may be occupied by a thick membrane, which obstructs the sight to such an extent that the patient appears to have gained nothing by the removal of his lens. The amount of the obstruction and the degree to which it interferes with the power of vision show wide varieties in different cases. Such opacities, films, membranes and other complications as result from the removal of the lens are best designated by the name "*Nachstaar*" or "after-cataract."

The term "secondary cataract" (*Cataracta Secundaria*) should, on the contrary, be reserved for cases in which the crystalline lens itself (still within the eyeball) has become more or less opaque or degenerated during the progress of some other disease of the eye, and as a consequence of that disease.

Consider briefly the structure of the lens and its anatomical relations with neighbouring parts.

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[1] Read at the Meeting of the British Medical Association, in Cheltenham, 1901.

Ophth. Review. Vol. XX., No. 240, October, 1901.

The crystalline is completely enveloped in the lens capsule, which is a nearly structureless membrane, thickest and most developed in its anterior layer, where it occupies the pupil, most attenuated at the centre of its posterior portion, where it lies in the hyaloid fossa. The lens is developed from the invagination of the ectoderm, which constitutes the closed embryonic lens sac. The epithelial cells which line the sac posteriorly rapidly enlarge and develope to form the lens fibres, which grow forward into the cavity of the sac until they practically fill it up and spread out in layers behind the anterior wall. The anterior layer of the primary lens sac takes little or no part in the production of the lens fibres; it persists throughout life as a continuous row of polygonal cells, which is known as the subcapsular epithelium.

This epithelial layer forms the anterior face of the lens and lies in contact with the capsule. It extends backwards as far as the edge or equator of the lens, where the characteristic unchanging polygonal cells gradually become modified and give place to elements which in appearance and conduct more nearly resemble those on the posterior wall of the sac from which the lens fibres were originally developed. It is from these transitional cells at the equator of the lens that growth continues, and that the transverse diameter increases, even after the antero-posterior growth of the lens is complete, and when the cells, once so active, at its posterior surface, can no longer be seen to exist. The subcapsular epithelial layer and the transitional cells near the equator of the lens play no doubt an important part in the development and organisation of the films and opacities which constitute after-cataract.

After-cataracts present many varieties. They may be characterised as "*simple*" if only the lens *débris* and the capsule are implicated. They may be "*com-*

plicated" by entanglement with some of the important structures around, the cornea, the iris, the ciliary body, or the vitreous. More serious cases, where inflammation has followed the cataract extraction, and where the capsular membrane, thickened by the deposit of lymph or morbid products, is adherent to the adjoining structures, have been well classed by Mr. Jessop under the heading "*inflammatory*."

Whatever be the nature or variety of an after-cataract, we may assume that it results from imperfections of some sort or other in the technique of the operation, or from a faulty healing; and the question arises: Can we by any special care at the extraction of the lens avoid the after effects which continue to obscure the sight?

A peripheral incision of the cornea and a conjunctival flap encourage a rapid healing, and lessen the likelihood of faulty adhesion between the cornea and the capsule. After delivering the lens, toilette of the eye should be thoroughly, but quietly practised, to ensure the absence from the wound of any fragment of iris, capsule, or lens matter. Bruising of the corneal flap should be carefully avoided, lest primary union should be interfered with.

Slow healing encourages the adhesion of the wound to the remains of the capsule or lens, the proliferation of granulation tissue and the development of a thick membranous after-cataract.

The method of lacerating the capsule at an extraction for cataract is likely to influence the after result.

A free tearing is advisable in order to leave a large opening afterwards, but care must be taken not to dislocate the lens or to damage the hyaloid. Many kinds of cystotomes, and hooks single and double, have been devised for this purpose; while Förster and others tear away a portion of the capsule by means of special forceps.

In ordinary cases I usually make a wide circular sweep over the face of the lens with a sharp, triangular Graefe's cystotome, in order to try and remove a portion of the thickest part of the capsule with the lens. Many operators no doubt do the same, while others make a triangular cut in the capsule for the same purpose. Gayet and Knapp[1] at one time advocated an incision parallel with the edge of the lens, and with the corneal wound, in order that any *débris* which remained after clearing away the lens should be kept closed up in the capsule, which was left, and the edges of which were intended to heal together rapidly. I believe this method is not satisfactory; the cortical *débris* is difficult to remove, and is not easily reached by the aqueous for solution. Useful against sepsis, the plan seems likely to cause a thickened membrane, and may further tend to the formation of a special variety of after-cataract occasionally met with, viz., a circumscribed mass of lens matter which persists for a long time, and looks as though a great part of the lens was remaining *in situ*. Swollen portions of lens matter often occupy the pupil after an extraction, but in the ordinary way become rapidly absorbed or shrunken, but I am specially alluding to a continuous swelling of the lens, which may remain so long as to require a further effort at extraction, and which, if it does not become absorbed or membranous, will not be benefited by any of the usual methods employed for dealing with after-cataract opacities.

Where a distinct capsular membrane exists as an accompaniment of lenticular cataract, it should certainly be removed. The lens may be extracted in its capsule entire, or the anterior surface may be included in a circular cut by the cystotome and then be extracted by forceps.

The first suggestion to remove the anterior capsule with forceps was probably made by Pontier (1804), and since then many have advocated this procedure in order to get rid of the one important element in the causation of opaque after-cataract membrane. Specially adapted forceps have been devised by Förster, de Wecker, and Schweigger, and many authorities systematically use them, instead of the cystotome, for opening the capsule in all cases of extraction in order to obtain a clear pupil. Terson (Toulouse),[2] recently writing on this subject recommends a pair of capsule forceps, very wide at the heel, so that this part is still open when the points are closely shut, and thus the capsule can be drawn out even in simple extraction without risk of implicating the iris.

He advocates careful examination of the capsule with full pupil dilatation in order to judge of its consistency, its freedom from, or adhesion to, the lens proper, and for any changes that may be present in its tissue. He uses the cystotome, or the forceps, or both, according to the condition present in each particular case.

In addition to a well planned corneal incision and thoughtful dealing with the capsule, the cortical *débris* must be as thoroughly as possible extruded from the eye. I have no experience of the introduction of any curette instrument into the lens cavity for this purpose. I should fear damage to the corneal wound, or the hyaloid, bruising of the iris or septic infection. Irrigation under thorough asepsis appears to be sound practice, but I have not tried it. Emptying and cleansing of the lens cavity can be made very thorough where an iridectomy is done, but in simple extraction I am strongly of opinion that it is more essential to have a perfect replacement of the iris and pupil than a thorough removal of cortical *débris*. In simple extraction I do all I can to ensure the escape of cortex and soft lens tissue with, or directly following upon, the delivery of the lens ; if then other fragments are seen to be left, they are also extruded, but scarcely any further toilette is practised for fear of causing paralysis of the pupil. The iris and pupil are replaced as rapidly as possible.

Probably, therefore, after simple extraction I have often a considerable amount of lenticular *débris,* but as a rule I rarely get a thick after-cataract membrane in these cases. This may be partly due to the fact that I now usually select the younger and healthier eyes for simple extraction, which may be more capable of absorbing *débris* and less liable to complications. In my opinion one great advantage of simple extraction is the continued separation of the corneal wound from the remains of the lens and capsule by the presence of the iris which has been left in its natural state and position.

The progress of the after-cataract must be to some extent modified by the removal of a piece of iris and by the exudation from its cut surfaces, even where no inflammation follows.

Of course an opacity of the capsule is less obvious in the unaltered pupil than it is in the modified pupillary opening with coloboma, which results from extraction combined with iridectomy. In the latter case, the physical character and attachments of the membrane are easily studied.

A pupil apparently clear may be occupied by a very fine, scarcely recognisable transparent capsule, perhaps wrinkled, quite free of the iris, and passing down behind it towards the hyaloid, but often thicker opposite the coloboma, and more or less attached to the extraction wound in the cornea. The capsule may be dotted with distinct opacities of altered lens substance, or may appear as a definite membrane. Such forms of simple after-cataract have been examined microscopically and described.

Mr. Henry Power,[3] in an exhaustive article on secondary cataract, gives a summary of the conditions found by Becker in the eye of a woman who died *two days after an extraction of the lens* with iridectomy. The wound was closed, the anterior chamber re-established, and the capsule with the remains of the lens probably occupied the same position as in life. The border of the excised iris was, it seemed, adherent to the cicatrix of the wound ; but no adhesion was visible between the iris and the capsule. The edges of the lacerated capsule were much folded, and were united by amorphous material towards the centre with the posterior capsule. The periphery of the capsular pouch contained a considerable quantity of lens substance, which, owing to the adhesion together of the faces of the capsule, appeared to be very completely shut off from contact with the aqueous humour. The fibres of the zonula Zinnii on longitudinal sections were swollen and thickened. The canal of Petit, with its characteristic folds, was distended. The entire layer of epithelium on the surface of the capsule was perfectly preserved. Some apparently healthy lens fibres were in the capsule and followed its inflections. The middle of the mass was composed of the detritus of the lens and broken-off lens fibres. No trace of cell growth was observable.

In another eye, examined by Becker *several years after the extraction of cataract*, the equatorial part of the capsule was considerably more thickened than usual; the zonula of Zinn was swollen. The subcapsular epithelium at the anterior capsule seemed normal, but at the equator of the lens the cells became multiplied, and as they approached the posterior capsule they became larger and more active, and seemed to be developing into imperfect newly formed lens. Towards the axis of the lens, the capsular membrane and its contents became thinner and showed broken-down lens fibres, cataract substance, fat, myelin, large cells without a nucleus, cholesterin crystals, and chalk granules.

Wagenmann[4] (Heidelberg) describes the microscopical appearances of an after-cataract in an eye which had undergone perfect healing after a good extraction of lens, with removal of anterior epithelium. At the time good vision resulted, but two and a half years afterwards this became much reduced by a delicate secondary membrane. Before any operation to improve the sight could be done, the patient died, and the affected eye was removed and examined. The anterior capsule, much folded on itself, existed only towards the temporal side. Here lying in a pouch, formed between the anterior and posterior layer of the capsule, was some old lens matter, alongside new formed products of lens epithelium. The epithelial layer was well marked on what remained of the anterior capsule, and it existed also in patches on the front of the zonula. The posterior capsule was complete and thickened, and here and there showed sub-epithelial cells.

Treacher Collins[5] has reported a series of cases in which glaucoma resulted after cataract extraction with iridectomy. The tension must have been due to something which occurred in connection with the individual operation, for in five of the patients the other eye had undergone extraction of cataract without untoward results. Pathological examination showed adhesion of the lens capsule to the extraction cicatrix in all the cases of the series except one, and in that one the hyaloid of the vitreous had come forward and become adherent to the corneal scar. In all the cases the angle of the anterior chamber in the coloboma was blocked, either by the root of the iris which had been left, or by the foremost of the ciliary processes, which had become dragged forwards, and was held in close contact with the posterior surface of the cornea by the upper portion of the entangled capsule.

Such faulty conditions of the wound and capsule, if they do not actually cause glaucoma, predispose the eye to an attack in case it becomes inflamed, or if a needle operation is done at some later period.

Despite every care in planning and executing the details of cataract operations, and even under conditions of satisfactory healing, we cannot, in a large percentage of cases, avoid the occurrence of after-cataract, which more or less interferes with vision. The most satisfactory extraction operations by no means always give the best results. Should inflammation occur, it obviously complicates the case by causing hypergenesis of the active epithelial cells of the lens, by iritic synechiæ and other unnatural adhesions and dragging of the structures, by plastic thickening of the pupillary membrane, or by a healing together of the coloboma.

In cases where healing, though eventually satisfactory, has been interfered with by the intrusion of septic organisms, we must remember the possibility that some of the latter are merely encapsulated and may again set up a severe septic iritis, cyclitis, or hyalitis, particularly when an operation for after-cataract is undertaken.

There is great diversity of opinion as to the risks of interference with opaque capsule after cataract extraction. Some look upon it as a very dangerous procedure. Others do the operation in a large percentage of their cases and without much hesitation. Some resort to it only in order to restore sight to an eye that is practically valueless for purposes of vision ; others when sight, though good, seems capable of being made still more perfect. In the first place, it is important to know what was done in the earlier operation, and how the eye healed after it ; for if inflammation, particularly septic inflammation, occurred at that time, interference should be resorted to only if necessary, and then with the greatest precaution.

In all cases the patient's health should have been attended to, the eye and all instruments used should be thoroughly clean and aseptic.

Careful examination of the membrane and its attachments should be made under magnification, and with concentrated light, with the pupil fully dilated, and advantage of these aids should also be taken during the operation itself.

I do not consider any *early* operation after extraction advisable ; it is quite uncertain how much *débris* may become absorbed, or to what an extent the sight may improve. A very large amount of *débris* may be present after the extraction, particularly if the lens has been immature, or in the case of a young patient, but it is exactly under these latter conditions that its natural absorption is most marked. We cannot tell early what change may occur, nor judge where the membrane is absent or thin to guide us in enlarging the opening. Any softened lens matter after separation by the needle will close together again, unless the tear is made deep into the vitreous, allowing it to protrude into the anterior chamber, and this would scarcely be accepted as good practice.

Before any operation for the relief of after-cataract, it is absolutely essential that thorough recovery should have taken place, and that the eye should be quiet, more especially if the extraction has been complicated by iritis or any inflammation. The irritability of the eye is easily re-established, the *materies morbi* readily made active. If the operation is done too early under those conditions, not only does the opening in the opaque membrane refill and give no good result, but intractable inflammation, destructive cyclitis or even panophthalmitis may result.

If the primary inflammation has been of a serious character, particularly if the ciliary body has been implicated, a year is not too long a time to wait before a further effort is made to restore the sight; indeed if the patient has moderately useful vision and there is an absence of complications that are likely to make matters worse, the eye had better be left alone. Increase of tension, abnormal intraocular fluid, or the existence of some faulty band or other condition for which operative measures may seem likely to effect a remedy, constitute exceptions in favour of interference. Each case must be taken on its merits, the slightest cutting in one eye may be risky, and if much is required to be done, dangerous; while in another, a radical measure such as extraction of the capsule may be hopefully attempted.

The object of the operation in an after-cataract is to produce a clear aperture for vision, but it should also aim at a correction of anatomical defects and of conditions likely to lead to malnutrition of the organ—such as synechiæ, constricting bands, or a tendency to glaucoma. On the other hand, it should avoid unnecessary damage of the surrounding structures. Interference should be effectual, but it should be limited in range; it should be delicately but rapidly executed. The thinnest part of the capsule near the pupil is the best point to select for making an opening. Synechiæ of the pupil should be divided.

Where it is likely to suffice, a modified Bowman needle is the best instrument to use. It must be made with a long cutting edge and be used as a knife. If there seems any tension in the capsule, cut across this where the pupil is to be made; usually the main cut should be horizontal with a second one at right angles through it. Should the capsule not readily divide but shift with the needle, at once introduce another one on Bowman's method[6 & 7], taking care that both needles penetrate the same opening in the membrane so as to tear a single hole and not leave a small band which divides the hole in two. Lougnon[8] (Moulins), to ensure a single opening, first passes a needle grooved on the side, along which he runs a second cutting needle.

It is useless to attempt to tear a thick movable capsular membrane with a needle, but in case one has tried to do so with the effect of simply pushing it backwards into the vitreous, an opportunity should be taken by moving the capsule gently about on the end of the needle, to ascertain whether it is attached by the zonula, or whether it is practically free in the vitreous, in order that one may form an opinion as to what further operation is likely to be most effectual and safe.

Where practicable, I avoid the use of a second needle; their manipulation strains both the case of the eye and the vitreous, but this is less harmful than dragging on the ciliary body, or on the base of the iris, which may be the case if only one needle is used. When the membrane is quite thick or is much implicated with the original pupil (which is in its normal position) a somewhat stronger knife is preferable to the knife needle. Passed in flat at the corneal limbus, it should be used to cut the membrane away from the pupil and to carry it up towards the coloboma. There are many forms of special knife or needle, modifications of Sichel's Iridotome, adapted for this purpose. Cutting, not tearing, should always, and under all conditions be employed to effect the opening in the capsule, but a tearing needle may be used in connection with the knife to fix some part of the pupil while the other cuts it; some operators use a sharp hook in the membrane to make a *point d'appui* against which the knife can cut, and others use a blunt one for the purpose of tearing open the aperture made by a knife, or even for the purpose of withdrawing the edge of the aperture with the adjoining capsule so as to cut it off with scissors.

Stilling[9] tears the capsule by means of two sharp harpoon-headed needles. They are introduced in the limbus cornea on opposite sides. Their flat faces passing in front of and parallel to the surface of the iris until they overlap in the centre of the pupil, they are then rotated and passed through the capsular membrane. As they are again drawn backwards, each towards the aperture of entrance, a hole is torn or cut in the membrane in any direction desired. When the capsule is very thick, the harpoon can be used for drawing it through a wound or wounds formerly made with a narrow keratome in the limbus. Stilling considers his needles suitable for any kind of capsule, thick or thin ; if withdrawn exactly as introduced they make very small wounds in the cornea, and scarcely injure the vitreous at all. He says that he formerly operated with the greatest hesitation on any after-cataract, but that now he finds the operation easy of execution and always successful.

When the secondary membrane is so thick or complicated that cutting with the knife, or knife and needle, is likely to be ineffectual, capsular or iridotomy scissors must be used. A sufficient opening in the limbus cornea for the introduction of the scissor blades is made by a narrow bent keratome, and the membrane, or membrane and iris edge, are divided as required.

While needle and knife operations are done with the anterior chamber practically closed, and in the presence of the aqueous humour, de Wecker's operation with scissors necessitates a free opening of the aqueous chamber and escape of the fluid from it, and thus septic infection or incarceration of the capsule may be encouraged. On the other hand, scissors operations avoid the drag on the ciliary body and the disturbance of the vitreous which is produced by discission. With the view of combining the advantages, and at the same time avoiding the risks of both methods, Levinsohn[10] (Berlin) uses a modified de Wecker's scissors (earlier suggested by Lindo Ferguson[11]), the blades about 8mm. long, small and fine, well pointed and very sharp, both at back and front of each blade. The instrument, with the blades shut, penetrates the cornea like a keratome, and is said to retain the fluid in the aqueous chamber, while the scissors can be used to lacerate the capsular membrane with their sharp backs as well as in the usual way.

There can be no doubt as to the great value of iridotomy with scissors where the capsule is firmly fixed, or where the iris fibres are stretched over the aqueous chamber by adhesion of the iridic pillars or of the pupillary region to the corneal wound. Where a thick capsule lies more or less free, it will be merely dislodged by efforts at discission, but it may be successfully bisected by the scissors.

Such cases of thick movable capsule as result particularly after discission in ill-developed eyes with congenital cataract, or where partial absorption of the lens after injury or disease has taken place, leaving the lens nucleus and fluid in the capsule sac, are best dealt with by extraction forceps, which draw out the sac or membrane entire through a sufficiently large corneal incision.

The ideal extraction of a cataract is that of the whole lenticular body in its capsule, and not merely the greater portion of it as is generally practised, but this procedure is only safe under exceptional circumstances. The total extraction of a secondary cataract, or of an after-cataract which consists mainly of hardened capsule, is also ideal, but it is not devoid of danger ; there may be unsuspected bands connecting it with the ciliary body which may be difficult to divide, and considerable escape of vitreous is almost inevitable, even if the eye is fairly healthy.

In my opinion extractions of the capsule by forceps should be our last resource, but in some cases it is the only one that gives hope of sight. Encouraging reports of this operation, however, come from Paris in M. Pley's Thesis (1898), on "Extraction total de Cataract Secondaire," and in M. Terrein's[8] report of Panas' operations at the Hôtel Dieu. An incision 5 mm. long is made with a keratome, and where possible the aqueous humour is retained. Liebreich's or Panas' forceps are passed sideways, one blade in front of the capsule and one behind it, the sac is firmly grasped between the blades and by small slow movements is gradually withdrawn entire. If adhesions are present they must be specially dealt with and the proceeding can be modified in details. If successful, this operation is complete and final. The reaction is said to be insignificant, and the patient soon well. I note in the statistics of Panas' cases that the vision before operation was very imperfect, so that perhaps only serious cases were treated by this method.

Da Gama Pinto[12] has recently gone back to the old method, by which Scarpa dealt with his after-cataracts that followed couching of the lens. The discission knife is passed through the sclerotic 6 or 8 mm. behind the corneal margin straight on into the vitreous and then forward through the pupil where the membrane is cut. There may be cases specially suitable for this method of sclerotico-nyxis, but it is not likely to replace keratonyxis as the usual procedure for capsulotomy.

Any operation for after-cataract may fail in its object through imperfect application. The edges of the cut capsule may again close together if considerable lens *débris* remains, particularly in old eyes, the discission may increase the swelling and produce intraocular tension.

Glaucoma has frequently followed the simple discission of a thin membrane when no such complication seemed probable; at one's visit the morning after operation the patient may be vomiting, or may have some discomfort of the eye, with hardening of the globe. A sclerotomy at once relieves the symptoms, and the relief may be permanent; but such eyes frequently continue to cause anxiety. Some adhesion of the capsule, or of the iris base, to the corneal wound, which followed the primary extraction of the lens, has ever since been predisposing the eye to trouble; but symptoms remained in abeyance until excited by the discission. In such cases the sclerotomy should be planned so that it may pass through the iris base or that part adhesion at which has started the mischief.

The entire withdrawal of the lens capsule, even its free division by means of scissors, are serious operations; they may easily introduce sepsis, or by damage to the ciliary body, or the vitreous, may lead to a gradual degeneration of the eyeball.

On several occasions I have seen a peculiar form of vitreous degeneration result from a simple needling operation; it looks as if a line of infiltration was passing back into the vitreous body, or as if some organic change had followed a tear in its tissue. The appearance is not unlike the line of bacterial growth which is seen in a medium after a culture experiment. The condition is probably, however, not due to active septic agencies; it does not lead to pus formation, nor to more than a slight hyalitis. The sight of the eye is much impaired, but no definite degeneration of the organ takes place.

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REVIEWS.

Elvidio Gasparrini (Sienna). Glaucoma Simplex consequent upon Neuritis. *Annali di Ottalmologia, xxx, iv.*, 1901.

Even up to the present day there is considerable difference of opinion among ophthalmic surgeons on the subject of the pathology of glaucoma simplex, or posterior glaucoma as some prefer to call it, and in particular upon the relation which exists between it and anterior glaucoma. Some, including Panas and Knies, regard the two conditions as essentially distinct, and indeed look upon glaucoma simplex in a totally different light as an atrophic affection of the optic nerve. But the fact of the existence of innumerable intermediate forms between the two varieties, and connecting the two extremes by an unbroken succession of intermediate types, and the further fact that in a given patient the disease which began in one form may reappear as the other, or merge into it, have led the majority of the profession to regard the two as differing forms of the same disease. Gasparrini illustrates this indubitable fact of the transformation of type from the simple into the acute form, by means of a case from his own experience in which a man who had lost one eye by acute glaucoma came to him complaining of symptoms of well-marked glaucoma simplex in the other, in which by and by acute symptoms came on. Another point of importance in this connection is the difficulty of diagnosis in certain cases between atrophy and simple glaucoma, a difficulty which is sometimes slight, but at other times extreme, for a case may be regarded as one of atrophy until, under some disturbing influence, we do not perhaps know what, acute symptoms of glaucoma come on, and its true nature is thereby revealed.

Gasparrini here relates three cases under his care in each of which posterior (or simple) glaucoma came on after, and apparently as the direct consequence of, retrobulbar neuritis. As will be seen, there was no room for uncertainty in the diagnosis in these instances.

The first of his cases recorded was that of a man, aged 70, who complained of a progressive diminution of sight in both eyes, without any other symptoms. Ophthalmoscopic examination revealed double optic neuritis, the discs being reddened and the margins blurred. The fields for white were ample, but those for colours were somewhat restricted. About six weeks later, the white fields were distinctly diminished, and the discs much better defined, but cupped; the vision had risen from $\frac{5}{20}$ to $\frac{5}{16}$, however, as the congestion of the discs had passed off. Tension having become increased, eserine was administered, under which vision improved to $\frac{6}{8}$; a few months later this improvement had gone, photopsiæ were again manifest, and the tension had risen, but under eserine these symptoms once more disappeared.

A second case was not dissimilar; a man, aged 58, admitted to hospital with severe double optic neuritis, the fields of vision being of approximately normal extent. Under anti-rheumatic treatment vision greatly improved, but presently degenerated again, worse than before; a large central scotoma formed, tension rose, and besides a certain degree of atrophy attributable to the previous neuritis, the disc was decidedly cupped. In this case also eserine brought about considerable improvement, but only temporarily.

A third patient, aged 15, recovered from an attack of double retrobulbar neuritis with vision of $\frac{5}{10}$ and $\frac{5}{15}$, after the lapse of a few weeks it was a little better yet, but presently began to deteriorate, while pains in head and eyes were complained of, photopsiæ, myodesopsia, and coloured rings round lights at the same time began to manifest themselves, and the field became reduced. The discs began to lose colour and become cupped. These symptoms, which came on first in one eye and then in the other at an interval of a few weeks, were dissipated by eserine instillations.

Turning now to the problem of the origin of glaucoma presented by these cases, Gasparrini discusses which of the two principal theories, the nervous or the circulatory, will best adapt itself to the needs of this somewhat unusual type of the disease. In the first place he points to the inefficiency of the results obtained by sympathotomy and sympathectomy to lend any additional support to the nervous theory, either in its original (Donders') form or in its more modern garb, and on the other hand emphasises that (1) in the chronic, non-irritative form the different purely mechanical obstructions to the circulation are capable of explaining the onset, irrespective of any modification in the secretion of intraocular fluids; (2) the hypersecretion produced by nervous influence, though its existence is still not demonstrated, is capable of obstructing the exit route and thus causing glaucoma; and (3) in virtue of inherited liability or racial disposition the filtration routes may have undergone such alteration as to render them barely sufficient for the physiological condition, and when any hypersecretion (by nervous influence) does arise, the system of drainage breaks down, and glaucoma is the result. It is hardly to be credited that hypersection of nervous origin, being merely a temporary condition, could give rise to a permanent state of glaucoma, unless the exits were mechanically less free than they ought to be. With these views, as expressed by de Wecker, Gasparrini expresses his complete accord, since they best harmonise with the clinical facts. The explanation of the cases he has just described he believes to be that the exudation in the course of the neuritis had had the effect of closing, more or less completely, the lymphatic canals enclosed within the sheath of the optic nerve. This would readily enough result in the cessation of removal of effete matters which takes place to a slight extent by way of the nerve sheath, and so the development of glaucoma would be favoured, if not directly produced. The type of glaucoma most likely to originate under such conditions would naturally be "posterior glaucoma," which, as we have seen, is exactly the form present in Gasparrini's cases. In support of his contention, the author points out that no case is known to him in which glaucoma followed that type of optic neuritis which produces a true amblyopia; in them it is only the macular fibres, and probably the lymph vessels incorporated with them, which are compressed and interfered with; thus there is not sufficient interference with the inoculation to give rise to glaucoma. He is not sure whether other surgeons have already recognised the connection between the two conditions, though somewhat similar cases have been already recorded, or whether his experience has been exceptional in this matter. W. G. S.

H. SALOMONSOHN (Berlin). Bilateral Paralysis of the Third Nerve. *Berliner Klinische Wochenschrift, xxvi.*, 1901.

Bilateral paralysis of the third nerve is a condition not so very uncommon, but in this case there were certain peculiar features which impart an additional interest.

A man, aged 49, presented himself, who was found on enquiry to have a very seriously tainted family history. Ten brothers of his father had died between the ages of 20 and 30, four of them having committed suicide while insane. The patient himself had been married for twenty-five years, and had had six children, two of whom had died, one from pneumonia and one from drowning; he had long been a heavy drinker, and had suffered in consequence from liver mischief. He had had gonorrhœa, and about seven years ago was treated for a vesicular inflammation of the prepuce, which the attending surgeon asserted was innocent, but which he treated by excision of the portion attacked; no secondaries had apparently ever been observed, and all possibility of syphilitic infection was denied. He first sought advice from Salomonsohn on account of double vision and pain radiating from the left eye; it was noticed that both pupils were of medium size and immobile to light, the left acted feebly to convergence, and accommodation in each was very imperfect. In a fortnight the paralysis of the left third nerve was complete, the upper lid hung down, the eye deviated to the left, and only the external rectus and the superior oblique retained power. In a few more months the other eye became affected, and both interior and exterior branches of both thirds became deeply paralysed. About the same time the patient complained of dulled sensation in the face, but tests failed to show any diminished activity of the fifth nerve; taste, however, was gone, all substances tasting sweetish; the sense of smell was also destroyed. There were, with all this, no symptoms of ataxia, no swaying when the eyes were closed; the patellar reflexes were active. The tongue was straight, there was no tremor of the hands, no interference with speech or swallowing, nor were the facial muscles attacked. His mental condition was unsatisfactory, he was forgetful, absent, repetitive, and committed many mistakes; headaches began to be complained of.

The diagnosis of the site of lesion is not easy in such a case, because in the first place, similar symptoms have been present in cases in which afterwards no pathological changes could be discovered. They have, in other instances, been due to a peripheral neuritis; it is quite possible to imagine them caused also by a basal new formation, by a nuclear lesion, by degeneration of the nerve trunks, by sclerosed areas among the nerve roots, and, as in the case of Siemerling's, by a combination of several of these conditions.

The fact of bilateral paralysis of the third being present suggests a basal lesion, and in favour of that is the simultaneous loss of function of the olfactory nerves, especially in a case in which syphilis is at least probable; and the complete loss of taste does not tend to make this situation less likely. On the other hand, the condition of the pupils at the first examination would suggest a nuclear situation, as does also the absence of general head symptoms and of any loss of intelligence. In Bernheimer's view, however, the presence of ophthalmoplegia interna is not absolutely demonstrative of a nuclear lesion. The most probable condition is a combination of nuclear and nerve degeneration.

One peculiar and interesting feature of the case remains to be discussed, the unilateral innervation, namely, of the occipito-frontalis. The facts stood thus: The patient had complete ptosis on each side, but notwithstanding this he could, though to a varying degree, elevate the right upper lid sufficiently to enable him to see with that eye. That this was due to no action of the levator was quite certain; if the hand was laid upon the brow so that the occipito-frontalis was prevented from acting, the right upper lid hung down as limp as the other. We are told that Mauthner was the first to notice this peculiar feature of certain cases of long-standing ptosis, and that it was in consequence of suffering himself from a traumatic ptosis that he did so. During the time of its persistence he learned to innervate the right frontal muscle voluntarily and so raise the lid, but on recovery of the function of his levator he lost the "art" of thus employing the frontal muscle. To return to the case of Salomonsohn's patient, it is very interesting to note that he could raise one lid only (the right) in this way, which in its way was an advantage, as he was thus spared the discomfort of the diplopia which the high degree of divergence produced when both lids were raised with the finger. A further curious point in this connection was noted, namely, that if when the patient was thus exerting his right occipito-frontalis, the left upper lid was mechanically raised, he was unable to hold up the right lid, as though the occurrence of diplopia inhibited the action. Mauthner had noted already that this action of his right frontal muscle was not altogether under his control, and occurred whenever he opened the left eye, even though causing him some little discomfort. This is analogous, though in the contrary direction, to two curious reactions which have been under discussion lately, viz., first the turning up of the eye, and secondly, the contraction of the pupil which occur on strong innervation of the orbicularis. In these two the powerful innervation "poured into" the facial nerve "flows over" into the third, but in this case it appears as if the powerful impulse poured into the third, but unavailingly, overflowed into the facial when the intensity of the stimulus reached a certain height. The author considers that the left side does not show this phenomenon because it was attacked some little time before the other. It must be recollected that the portion of the facial nerve interested in this movement has its place of origin in the nuclei immediately posterior to the nuclei of the third.

W. G. S.

FRENCH SOCIETY OF OPHTHALMOLOGY.

Congress of 1901.

Glaucoma.—De Wecker presented a very long paper dealing with the value of iridectomy in glaucoma, with a summary of the views of many surgeons. The paper was divided into four portions, dealing respectively with the historical aspect of the treatment of glaucoma, the various substitutes for iridectomy, the forms of the disease which seem adapted rather for medical than for surgical treatment, and the value of iridectomy in the treatment of the disease in general. The first division of the paper (of which an interesting summary is given in *La Clinique Ophtalmologique*, 9, 1901) deals of course chiefly with the early labours of v. Graefe in this field, showing how paracentesis, and operations upon eyes not glaucomatous or with secondary glaucoma, led the way to the great discovery of the wonderful influence of iridectomy; it gives his classification of the disease into inflammatory and chronic glaucoma, and amaurosis with excavation, for he at first regarded the condition now known as glaucoma simplex as primarily a disease of the nerve, though subsequently he somewhat altered his views. In the third section, when speaking of the indubitable temporary benefit to be obtained from the use of myotics, de Wecker asserts that myotics never yet cured a glaucoma themselves, and have many a time, by reason of their purely temporary help, caused really effective operative treatment to be postponed till too late. He is a zealous advocate of iridectomy in glaucoma simplex, and does not give much quarter to those who differ from him on this question. It was naturally round this point that the battle of opinion, stirred up by the paper, raged most hotly, for as regards the value of iridectomy in the more congestive forms of glaucoma there can hardly be said to be two opinions. Naturally a great deal depends upon the personal definition of "chronic simple glaucoma," for by this term one author may mean cases of tension without irritation, another excavation and reduction of field with or without tension, another does not consider the term suitable if any increase of tension be present at the moment. It would be impossible here to give any account of the discussion without occupying more space than we can afford ; perusal of the French journals in which the speeches are given *in extenso* will, however, well repay the trouble taken by a reader.

Panophthalmitis.—M. Dor finds that when one has carefully determined the minimum dose of a certain culture of staphylococcus pyogenes which is sufficient infallibly to cause panophthalmitis when injected into the vitreous, he can prevent this action by administering previously an injection of a certain quantity of iodide of potassium ; but this drug is of no value if not given till after inflammation has set in—it has a marked prophylactic, but no curative value. He advises that when we are about to perform upon a patient any operation which may lead to panophthalmitis, we should do well to administer on the preceding evening a large dose of the iodide.

Blastomycetes in ocular pathology.—M. Parisotti has found this form of organism in trachoma, pterygium, and spring catarrh : he considers that they act as foreign bodies.

Panophthalmitis consecutive to Staphyloma of the Cornea.—M. Jocqs related the case of a girl of 6, in whom panophthalmitis had occurred unprovoked in an eye with complete staphyloma, the result of ophthalmia neonatorum. He had eviscerated, or rather cleared out the vitreous, with good result. He considered that a fresh infection of the adherent iris had occurred. In the discussion, evisceration, free opening followed later by enucleation, enucleation on the spot, and evisceration by the cautery, were all advocated in such cases by various speakers.

Alterations in the Pigmentary Layer of the Retina in various pathological conditions of the eye.—MM. Gayet and Aurand arrive at the following among other conclusions :—The lesions which occur are essentially those of degeneration, the cell first hypertrophies, next it gradually loses its pigment and becomes relatively colourless, and may then break up. The pigment granules thus liberated are not lost, but are taken up by neighbouring cells which thus become more deeply coloured, and to this fact, not to a fresh pigment formation, is due the dark tinting in the neighbourhood of an inflamed region. Thus, even in cases of choroidal atrophy, the neighbouring cells in the retina gorge themselves with the pigment, whose transference, whether enclosed in leucocytes or not, is largely effected by the lymph current.

Congenital Ophthalmoplegia.—M. Lagrange exhibited a case in which there was bilateral paralysis of the external rectus and "superior facial." Since it seemed probable that the lesion was a nuclear one, the case lends additional probability to the opinion now largely held, that part of the facial nerve has its nuclei of origin in extremely close relation to the sixth nucleus.

Tumours of the Lachyrmal Gland.— M. Fromaget reported three cases. The first was a myxo-sarcoma of the palpebral portion in a man of 24, the second was a tubular epithelioma of the orbital portion in a man of 56, the third was a hydatid cyst in a woman of 65.

Treatment of Dacryocystitis.—M. Baudoin has found that in simple, uncomplicated dacryocystitis, whether the secretion be mucous or purulent, the best treatment consists in the introduction of a hollow style, and washing out, preferably with protargol solution of 5 to 20 per cent.

Spontaneous Dislocation of the Lens into the Anterior Chamber after Iridectomy in acute Glaucoma.—M. Armaignac has seen this occur twice. The first patient was a man of 70, who had lost one eye from optic atrophy ; in the other he was attacked by acute glaucoma, with blood in the anterior chamber. Paracentesis was performed, and immediately afterwards the lens appeared in the anterior chamber and became caught in the wound. The author was afraid of a destructive hæmorrhage if he were to make a large section, and therefore removed the lens only little by little in several sittings; by this manœuvre he was able to avoid the occurrence of hæmorrhage. The second patient was a woman of similar age, who had an attack of acute glaucoma following a blow on the eye ; myotics not proving of any value, sclerotomy was done, but without advantage either to pain or to tension. A fortnight later the author proceeded to perform iridectomy, but he had scarcely made his incision when the lens presented itself in the wound ; here again its removal piecemeal was attended by a success greater than seemed likely.

Ulceration of Cornea of Arthritic origin.—M. Abadie mentioned first the slight degrees, which are very frequent, in which the patient complains that on waking he cannot open the lids without using his fingers, although there is little or no secretion, except a slight froth at the canthi ; at the same time there is some blepharospasm which may give considerable annoyance. For such conditions he finds benzoate of soda internally and an alkaline lotion to be the best treatment. Next he described a more serious variety in which marginal ulceration forms, often circular, sometimes taking a serpiginous type, and becoming grave unless recognised and properly treated in its early stages ; accompanying this there is a varying degree of pain in the eye and face. Salicylate of soda with quinine answers well in such cases, and sometimes much benefit can be obtained from tincture of rhus toxicodendron.

Detachment of Retina following Sympathectomy.—M. Bellencontre related the case of a patient suffering from exophthalmic goitre, who had derived great benefit from sympathectomy, but in whom detachment of the retina came on three years later ; this was followed shortly by unsoundness of mind and sudden death.

Recovery from Albuminuric Retinitis.—M. Rochon-Duvigneaud described two cases : the first was that of a woman of 31, who at the close of a pregnancy suffered from an attack of epithelial nephritis, which gradually merged into one of interstitial nephritis. During the acute attack the fundus showed characteristic retinitis, but by the end of a year appearances were entirely different, and there remained only a pale disc with some pigmentation about the posterior pole. The patient died of pneumonia some eight years or so after. The second case was that of a man of 32 who one month after the onset of nephritis showed retinitis ; from this he recovered, and in a year, though the discs were somewhat pale, the vessels were normal ; in the right eye there remained an irregular pigmented patch near the macula. All this was six years ago, and up to the present the patient had remained apparently in good health, though with a trace of albumin ; he was able to read small print with his better eye and large print with the worse.

Tumours of the Orbit.—MM. Chevallereau and Chaillous related three cases in which Krönlein's operation had enabled them to remove tumours of the orbit without leaving any further trace than a trifling and inconspicuous scar. In the first two instances the tumours were psammomata, occurring in patients aged 19 and 22 respectively, in whom they had existed for six or seven years at least ; in one of these the tumour was attached to the optic nerve. In the third case, the growth was a myxo-sarcoma of the optic nerve in a child of 5 years.

Otitis and Ocular Paralysis.—M. de Lapersonne.—From the relations between the bulbar nuclei of the vestibular nerve and the nuclei of the sixth, it is not difficult to explain the occurrence of nystagmus and ocular paralysis in otitis. It seems also that ptosis and paralysis of accommodation may similarly result, and de Lapersonne now reports a case of paralysis of the superior oblique of otitic origin; this appears hitherto to have been an unknown occurrence.

The Legibility of "Anastatic" Printing.—M. Sulzer. By anastatic printing is meant printing effected by a process in which the impressions are deposited by chemical agency. Briefly, this special process is conducted thus: the original of which a reproduction is desired is first washed in an alkali, and again in tartaric acid; it is then moistened with nitric acid and pressed firmly upon a smooth zinc plate. The acid absorbed by the paper thus attacks the plate, to which the ink is at the same time transferred. The plate is then treated with a mixture of gum and phosphoric acid, so that, when an ink-bearing roller is applied to it, this ink is retained only by the originally inky portions, the gummy solution protecting the metal itself from contact with the roller; the plate is then ready for reproduction, and the impressions may be conveyed to another plate or to a lithographer's stone. An evil-feature of this system, which is extremely valuable as reproducing all the peculiarities of an old text with great precision, is its decidedly inferior legibility as contrasted with ordinary printing. Sulzer estimates that if the original text can be read at 125 cm., the anastatic reproduction is visible only at 70. Even this can be done only in a good light, and when the light is reduced, the inferiority of the copy becomes even more decided. He suggests a method by which one can estimate the intensity-relation between the print and the paper. The difference ought to be 100 per cent., of course, for the paper ought to be so white as to reflect all light, and the ink ought to be so black as to retain all. White magnesium may be caused readily enough to become deposited as an intensely white layer upon paper, and there is velvet in the market which is, practically speaking, absolutely black. A Masson's disc may be composed of these two in varying proportions, and the resulting grey, when the disc is set in motion, made to agree with that produced by the rotation of a ring cut from the print. The inferiority of the anastatic print is thus made very evident, and the opinion was expressed that such books should never be placed in the hands of children.

Iritis and Keratitis after Mumps.—M. Pechin drew attention to the occurrence of iritis and keratitis (as well as inflammation of conjunctiva, lids, and lachrymal glands, &c.), as occasional complications of mumps. Of a case which came under his own care he gives a short account.

Delayed Healing after Operation for Cataract.—M. Guibert related a case in which the anterior chamber did not form for three months after extraction. The explanations of this condition offered from time to time by various surgeons are by no means satisfactory; the author believes that it is really due to imperfect closure at certain points, leaving minute pervious areas at which the aqueous can slowly filter out: these form in process of healing owing to the lack of vitality in the wound margins. Like others, he has found that stimulation of the lips of the wound is sufficient to promote rapid healing in cases in which the anterior chamber has not formed in several days: this stimulation he prefers to apply by very light cauterisation.

Picric Acid in the Treatment of Blepharitis.—M. Fage was led to employ this remedy in blepharitis from observation of its beneficial effects in burns, herpes, eczema, &c., and has been much pleased with his results from its use. He has the lid margin well washed and all grease removed, and then paints on again and again as it dries a ·8 to 1· per cent. solution, allowing each layer to dry before applying the next, thus forming a protecting covering. One can also employ a glycerine or gummy solution in a similar manner. The application acts in virtue of its analgesic, antiseptic and keratoplastic properties. If patients are reasonably careful there is no risk from the aqueous solution, and the yellow colouration of the skin is barely visible.

Hypertrophic Conjunctivitis.—M. Antonelli has seen a number of cases of conjunctivitis of a form which scarcely falls into the classical categories. The disease attacks chiefly the tarsal membrane and the lower *cul-de-sac.* The patient complains simply of moderate lachrymation, sandy feeling in the eye, and slight photophobia, especially in the evening; there is little or no secretion, the conjunctiva appears somewhat reddened, chiefly in patches near the lid margin, the lower lid is a little thickened, as well as the conjunctiva in the lower *cul-de-sac*, where the folds seem more numerous and voluminous than usual when the patient looks up.

[*A number of other interesting papers were read, some of which are not yet published, and which may be reviewed here in due course.*]

CLINICAL NOTES.

Detachment of the Retina during Labour.—A case is described by Hann and Knaggs, of a patient, aged 21, who when first seen had been in labour for twenty-four hours. She had had scarlet fever when a child, it was understood, and for the last three weeks face, hands, feet and legs had been œdematous. She had become semi-comatose, and was evidently quite blind, the loss of sight having been of sudden onset apparently. Labour was then terminated, but for thirty hours after the birth no urine was excreted. At this time very obvious detachment of the retina was present in each eye, the whole lower third being displaced, and she was still practically blind. Her general condition then began greatly to improve, and less than a month afterwards no detachment could be made out with the ophthalmoscope. In six weeks she had nearly $\frac{6}{9}$. and there was only slight loss of the upper portions of the fields. The authors incline to the view that the detachment was in reality part of the general anasarca which was present to a high degree in this case, and they appear to consider that temporary detachment of the retina under similar conditions may be more frequent than one is apt to suppose.—*Lancet*, May 18, 1901.

Myotics in Glaucoma.—Wicherkiewicz considers a 1 per cent. solution of eserine much too strong for clinical purposes and advises the use of much weaker solutions. With a solution of ·1 per cent. instilled more frequently, the good effects of eserine may be attained without its drawbacks. For purposes of prophylaxis in glaucoma, pilocarpin is more suitable than eserine, and a strength of 2 per cent. is advised. A mixture of eserine, pilocarpin and cocaine, such as is used by many surgeons, is much praised; the cocaine in this case being able to exert its well known influence in reducing tension, while its mydriatic action is checked by the other constituents.—*Klinische Monatsblätter für Augenheilkunde*, July, 1901.

A NOTE ON THE TREATMENT OF HYPOPYON ULCERS OF THE CORNEA.[1]

By H. Herbert, F.R.C.S., Major I.M.S.

Before we can treat hypopyon ulcers scientifically we need to know more about the derangements of the anatomy and physiology of the affected eyes than we do at present. On p. 43 of vol. xix. of the Ophthalmological Society's *Transactions*, referring to the irido-cyclitis secondary to ulcus serpens, I said, "In a fair proportion of these cases there are changes in tension so marked as to be readily detected by the finger in spite of much swelling of conjunctiva and of lid tissues. The eyes were usually found distinctly hard at the height of the inflammation when the ulcer had spread, and there was a considerable hypopyon; while at an earlier stage, with small ulcer and perhaps small hypopyon, the eyes were softer than normal." I would repeat this statement now, merely extending the observation of secondary glaucoma to many atypical cases of suppurative keratitis. There are, on the other hand, many ulcers which possibly perforate too rapidly, *e.g.*, in gonorrhœal ophthalmia, or in which the irido-cyclitis is either too mild, as in perforating marginal phlyctenular ulcers, or of too asthenic a type, as in neuroparalytic keratitis and in the suppurative keratitis of marasmatic infants, to produce high tension. Apart from my own statement, the only published references to ulcus serpens in connection with glaucoma relate apparently to ulcers occurring in eyes already the seat of absolute glaucoma.[1] I have such a case under treatment at present; but, compared with examples of secondary glaucoma from ulcus serpens in eyes previously sound, these cases are in my experience rare. Is it possible that some of the published cases have in reality been examples of secondary glaucoma? May the closure of the filtration angle have been due to the high tension, and not the cause of it? I have a section of an eye labelled "extensive ulceration of cornea, large hypopyon," from a man aged 35 years, no mention of abnormal tension; on one side the iris is for some distance in contact with the periphery of the cornea, and on the other side the filtration angle is certainly not normally open. I have also sections labelled "irido-cyclitis, secondary glaucoma," "interstitial keratitis," "kerato-iritis with plus tension," "pseudoglioma, cyclitis, plus tension," all showing firm closure of the angle by adhesion, presumably the effect of secondary glaucoma, and mostly with rather deep anterior chambers. This is in direct contrast with the widely open filtration angle figured by Priestley Smith in secondary glaucoma from "serous cyclitis."[2]

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[1] Read at the Meeting in Cheltenham of the British Medical Association, 1901.

Should closure of the filtration angle prove to be of frequent or regular occurrence in glaucoma secondary to irido-cyclitis, whether due to corneal suppuration or not, it may perhaps explain the failure of atropin to relieve[3] many such cases. However this may be, my personal experience is in favour of attacking the cause of the high tension with as much atropin as the patient can stand, at the same time relieving the tension temporarily with the knife. That atropin alone may give relief in some of these cases is certain.

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[1] See Petit, *Annales d'Oculistique*, October, 1900, and the references there given.

[2] Norris and Oliver's System, vol. iii., p. 634; and elsewhere.

[3] See Nuel in Norris and Oliver, vol. iv., p. 189 and 215; also Brailey and Stephenson in vol. iii. of the same, p. 306.

I well remember an instance that brought me considerable credit. The patient had been under treatment by several medical men for suppurative keratitis, with plus tension and deep anterior chamber. Paracentesis had been done once without any permanent effect on the tension, and the patient would not allow it to be repeated. I ordered five or six instillations of atropin, 4 grs. to the ounce, at short intervals. The patient finding relief, went on with the drops beyond the instructions, and the same night obtained complete cessation of pain with reduction of tension, which never returned, and the case rapidly got well.

When the cautery has to be used plus tension is relieved by puncture, generally crucial, through the base of the ulcer, after cauterisation. Otherwise the paracentesis usually consists in a small sub-conjunctival sclerotomy, done with a very narrow old Graefe knife. The scleral puncture is made sub-conjunctival by first sliding the conjunctiva caught on the point of the knife, and the counter-puncture is made very slowly, to allow aqueous to collect under the conjunctiva sufficiently to raise it from the point of the knife. As a rule the iris is too stiff with infiltration to tend to prolapse. Otherwise a small bridge of imperfectly divided sclerotic is left, and occasionally the iris may need replacement with the back of the knife in withdrawing it. An occasional objection to the sub-conjunctival incision is bleeding into the anterior chamber. Its advantage lies in the fact that it may be done on out-patients. It is recognised that the paracentesis is simply to relieve tension, and not to get rid of the pus.

In other respects our lines of treatment are orthodox. Almost absolute reliance is placed on the galvano-cautery in early ulcus serpens.

AN UNUSUAL FORM OF KERATITIS ASSOCIATED WITH A GENERAL SKIN ERUPTION.[1]

By Charles Blair, M.D., F.R.C.S.

Assistant Surgeon, Westminster Ophthalmic Hospital, London.

This case is, I think, of considerable interest, first, on account of its being an example of a rare condition, and secondly, on account of its very close association, and evident connection, with a cutaneous eruption.

The patient, who is a young man, aged 18, has on the inner and outer side of each cornea a markedly raised, vascular, opaque and firm swelling, more marked on the outer than the inner side, involving the limbus and the adjacent part of the cornea. On the outer side it is so much raised and defined as to be suggestive of a new growth. It is, however, stationary, not having apparently increased for the last two years, and it is symmetrical. There has been no ulceration, and the rest of the cornea has remained all through quite clear, and is free from any signs of former keratitis. There have been no signs of any lesion of the palpebral conjunctiva. There has also been no iritis nor cyclitis, and the vision has remained throughout perfect in each eye.

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[1] Read at the Meeting in Cheltenham of the British Medical Association, 1901.

The course has been marked by exacerbations, which have occurred at irregular intervals, when the eyes have become painful, and the swellings larger and more injected.

At the same time as these exacerbations have taken place the face, and to a less extent the whole body, have become covered with a papular and pustular eruption, causing the patient so much irritation as entirely to prevent sleep. This has lasted, as a rule, for a few weeks and then subsided, only to recur again after an indefinite period. About two such attacks have occurred each year.

These recurrences of skin eruption have always been coincident with the exacerbations of the eye lesions, and this has been so marked as to make it quite clear that they were in intimate connection.

In some respects these growths on the limbus resemble those described as occurring occasionally in the affection clinically known as spring catarrh, but differ from this description in the entire absence of the characteristic condition of the palpebral conjunctiva, in the exacerbations not occurring only, or even generally, in the warm weather, and in its close connection with a general eruption.

I consider that this eye lesion, whether related to spring catarrh or not, is a part of the general skin affection, and that both are the result of a common cause, some constitutional dyscrasia or trophic disturbance.

A CASE OF ACUTE PRIMARY GLAUCOMA TREATED BY ESERINE.

By E. Donaldson, Londonderry.

It is always instructive, but not always flattering, to follow a case in which one's advice has not been taken. On a certain occasion I was consulted regarding a case of acute primary glaucoma, and advised iridectomy; but my advice was not taken. I must now admit that the patient's refusal of operation had more wisdom in it than I had any idea of when I first saw her.

The case was as follows :—

Mrs. S., aged 86, and in rather feeble health, was first seen in her own house on March 10, 1896. A few days after Christmas, 1895, the left eye became painful and red, and the sight failed. This attack lasted a couple of days, and after it the sight so far returned that she could read. The eye remained well till March 7, 1896, when it again became red and painful, and vomiting occurred. On March 10 I found the eyeball congested, cornea slightly hazy, tension + 1, pupil dilated, anterior chamber narrow. There were a few striæ of opacity in the lens. I could get with ophthalmoscope a red reflex, but did not succeed in making out any details of the fundus. She could count fingers at about six feet. She said that her sight was variable, and that she saw a bright circle round a candle. There was some œdema of the eyelids, and she complained of occasional pain in the eye.

The other eye had been lost a great many years before. A "wart," the patient said, had been noticed on the front of this eye at birth, and had been removed some time after. It would appear that the eye had collapsed after this operation.

Eserine was instilled into the left eye, and the patient proved to be very tolerant of it, and bore without any inconvenience a solution, gr. i. ad ℥ss., used five or six times a day with a little cocaine added to it. The pupil contracted under its influence fairly well — its diameter became 2·5 mm. The sight improved so that she could write a letter. The eye was kept constantly under the influence of eserine, and the acute glaucomatous symptoms did not return.

I met her when driving on September 1, 1896. She was still using the eserine solution six times a day, was in good spirits, and congratulated herself that no operation had been done. On September 2 I got a letter written by herself. I did not see her again. She died on March 23, 1897. One week before she died she wrote a letter, and her eye remained in a satisfactory state to the end.

It will be noticed that this was a case of mild acute primary glaucoma of an intermittent character, occurring in an old person with striæ in the lens, who tolerated eserine well. This is the only case of primary glaucoma in which I have known eserine to take the place of iridectomy, and to prove sufficient treatment. The patient lived one year after the commencement of the treatment, but whether the eserine would have continued of the same service to her had she lived longer I cannot of course say. I regret that after my first visit I had no opportunity of taking a chart of her field of vision.

REVIEWS.

S. BERNHEIMER (Innsbruck). The Position of the Sphincter Centre. *v. Graefe's Archiv für Ophthalmologie, lii.*, 2.

This paper is an account of an experimental study undertaken by Bernheimer for the purpose of corroborating the conclusions arrived at in his previous investigations, both anatomical and physiological, with regard to the position of the centre of the sphincter iridis. The investigations referred to had been made by examining the brains of human embryos at various stages of development. It was concluded from the development of the respective medullary nerve sheaths that the centre must be identified with the small-celled bilateral middle nucleus, situated in the anterior third of the nucleus of the third nerve, between the two main divisions of the latter, to which it also belongs anatomically.

Bernheimer found this smalled-celled middle nucleus also in the monkey. Destruction of all the external eye-muscles was followed by changes only in both lateral principal nuclei, while the cells of the mesial nuclei and of the single large-celled median nucleus remained unchanged. After destruction of the internal muscles of the eye of a monkey, it was found that only the ganglia of the small-celled middle nucleus of the same side were altered, and also part of those of the single median large-celled nucleus; whereas all those ganglia of the bilateral principal nuclei that had shown changes after destruction of the external eye muscles, remained intact. Bernheimer concludes from this that the origin of the oculo-motor fibres supplying the external eye muscles must be placed in the bilateral principal nuclei, and that the fibres supplying the inner muscles come from the so-called accessory nuclei, viz., the bilateral small-celled middle nucleus and the large-celled single median nucleus, and that these fibres do not decussate.

There remained, of course, the question, which accessory nucleus belonged to the sphincter and which to the ciliary muscle. By cutting through the optic nerve of monkeys it was shown indirectly that the small-celled middle nuclei supply exclusively the sphincter of the same side, so that the large-celled median nucleus would remain as common centre for both ciliary muscles.

Further physiological experiments on the monkey corroborated these conclusions to the author's satisfaction, but the doubts which Bach and Marina threw on them caused Bernheimer to attack the subject again experimentally, and this time by a different mode of procedure, viz., by destroying the function of one—or both—of the small-celled middle nuclei. The author's reasoning was this, that if his assumption were correct, the isolated destruction of this nucleus must be followed by a permanent absence of reaction to light of the pupil of that side.

The experiments were made on six healthy specimens of the Rhesus monkey. In view of the importance and difficulty of the operation the technique is described in full.

The animals survived from half a day to thirty days, and could all be examined with regard to the reaction of the pupil and the movements of the eyes. The *isolated* destruction of one middle nucleus, however, was only carried out successfully in one case, as shown by the subsequent macroscopic and microscopic *post-mortem* examination. In this one case the operation went on very quickly and smoothly; the monkey had recovered sufficiently after three-quarters of an hour to stand upright in his cage, and to eat sugar and to drink tea. Examined later on the same day the left pupil was found of medium size, while the right one was dilated *ad maximum*. The left pupil reacted to light perfectly normally, but there was no reaction of the right pupil whatsoever, whether the right or the left eye was exposed to light. On the other hand, exposure to light, or screening from light of the right eye, produced a reaction of the pupil of the left eye.

This state of affairs remained unchanged for all kinds of light for four weeks. After that time the animal was killed for the purpose of examining the extent and locality of the injured parts of the brain. The microscopic examination showed an undoubtedly complete destruction of the right small-celled middle nucleus. All the other parts of the right half of the region of the oculo-motor nucleus were unaltered, as well as the large-celled median nucleus. Almost equally conclusive were the negative results in the other five monkeys. In these no functional derangement had followed the operation, and the *post-mortem* examinations showed that in all these cases the whole nuclear region of the oculo-motor area, not merely the small-celled nucleus, had by chance escaped the injuring knife. In two of these cases, the only injury had been in the roof of the corpora quadrigemina overlying the anterior third of the oculo-motor nuclear region, but without reaching the latter. The absence of any functional defect has again proved the conclusion, derived from previous experiments, that the anterior roof of the corpora quadrigemina contains neither centres of nerves of eye muscles, nor any neurons at all.

K. G.

E. FUCHS (Vienna). Sclerosis and Atrophy of the Corneal Margin. *von Graefe's Archiv für Ophthalmologie, lii.*, 2.

Fuchs gives a description of several cases in which a furrow formed spontaneously just within the margin of the cornea, without co-existing or preceding ulceration. In one instance the eye was examined microscopically. They mostly occurred in old people, and appeared as a senile degeneration in connection with the arcus senilis.

The latter consists in a deposit of hyaline flakes in the superficial layers of the cornea. In preparations stained by Weigert's method the small flakes are quite black, the larger ones of a brownish tinge. They begin in the neighbourhood of the margin of Bowman's membrane, and are situated in the superficial lamellæ of the cornea, occasionally in the basal, or even in the middle layers of the epithelial cells. Sometimes they are large enough to show as white spots when the living eye is examined with a magnifying glass. There is a certain analogy between the arcus senilis and the so-called band-shaped opacities of the cornea; both are superficial, both are caused by some amorphous substance (in the one a hyaline substance, in the other lime), and both are due to disturbed nutrition. But this disturbance is not the same in both processes, nor is the locality identical; the "ribbon" opacity occupies that part of the cornea which is left unattacked by the arcus. The latter almost always begins in that part which is constantly covered by the upper lid, the ribbon opacity always avoids this part. Leber is of opinion that the deposit of lime in Bowman's membrane which causes the ribbon opacity is due to the evaporation in the rima palpebrarum. Is it not at least possible that the hyaline deposit is caused by the restricted evaporation in those parts that are almost always covered by the lids?

It seems that the hyaline flakes can be dissolved, if the centripetal progression of the arcus is not an erroneous observation. Also those cases tend to prove it in which the arcus is partly replaced by a furrow which becomes finally quite transparent.

The description of four such cases is given: the first, a woman, aged 66, had a well-developed arcus senilis in the right eye. In the upper inner quadrant it fell off perpendicularly into a furrow which passed quite gradually into the limbus. The left eye had been destroyed by ulcus serpens.

In the second case (a woman, aged 77) both eyes were affected in a similar way.

In the third case (a woman, aged 53), the right eye only was attacked. The thinning of the margin had allowed the cornea to become ectatic under the intraocular pressure; the central part had been pushed forward, thus forming a sort of step out of the marginal circular furrow.

The fourth patient, a man, aged 63 had often suffered from conjunctival catarrh, but never from any serious inflammation. Both eyes were affected, the right being glaucomatous. Two years later the patient showed himself again; the right eye had lost all vision, and become painful, so that the eyeball was enucleated. The microscopical examination showed the central wall of the furrow to be perpendicular, the peripheral wall, however, gently rising towards the limbus. In the region of the furrow and a little beyond, the corneal lamellæ appeared to break up into separate bundles of fibres with increase of nuclei and new formation of blood-vessels. A decrease of corneal tissue was noticeable; certain of the corneal lamellæ ended at the central wall of the furrow, and only the remainder, thin bundles of fibres, split up, continued their course as the deep layers of the cornea. The process seems to begin with a disappearance of Bowman's membrane; then follows the separation and vascularisation of the superficial cornea lamellæ. This process remains superficial, but at the central margin of the furrow descends into the deeper layers of the cornea. The hyaline flakes, which must have been there—within the area of what was once part of the well-developed arcus senilis—disappear, evidently dissolved by the altered corneal tissue. The corneal epithelium is unchanged; in the hollow of the furrow the characteristic basal cells of the corneal epithelium cease, and are replaced by the much lower cubical basal cells of the conjunctiva. The inmost layer of the cornea is normal throughout, and so is Descemet's membrane.

These furrows are *not* the result of marginal ulcerations. They come about in this way, that Bowman's membrane disappears first; then the superficial lamellæ of the cornea are changed into a fibrillary tissue of smaller volume, probably by solution of the cementing substance that held them together, and of parts of the fibres as well. This process starts from the periphery, and occupying a certain depth from the start advances towards the centre. The new formation of blood-vessels which the microscopic examination revealed in the bottom of the furrow appears to be the first change that takes place; they are responsible both for dissolving Bowman's membrane and the corneal substance.

As for the stimulus which causes in the first instance the proliferation of the blood-vessels, only vague assumptions can be made: possibly it may be found in the accumulation and presence of the hyaline flakes in the arcus senilis. A certain analogy for such an occurrence would be found in the formation of the pterygium in consequence of the hyaline degeneration of the conjunctiva which causes the pinguicula.

K. G.

H. WINTERSTEINER (Vienna). Posterior Abscess of the Cornea. *v. Graefe's Archiv für Ophthalmologie, lii.*, 3, 1901.

Naturally it is but rarely that an eye affected with a recent and uncomplicated ulcer of the cornea can become the subject of anatomical investigation; the author is moved to describe three such cases with the view of discussing the question, recently revived by Petit, respecting the occurrence of posterior abscess of the cornea in cases of ulceration, and of perforation of Descemet's membrane in the early stages. The first eye was that of an infant, aged 2, the subject of small-pox; the precise pathological appearances are described at considerable length and then summed up as follows:—A large shallow ulcer of the cornea, with extensive necrosis, reaching even to the margin of the cornea all round; the whole cornea has sloughed nearly entirely as the result of the purulent inflammation. A deep abscess of the cornea exists with perforation of Descemet's membrane, but without perforation of the whole thickness of the cornea. A large collection of pus is present in the anterior chamber, in free communication with the cavity of the posterior abscess of the cornea; iritis, cyclitis, and commencing cataract are also present. The eye shows none of those other complications, such as were supposed to exist when these cases were first described.

When writing of a case in which there was no posterior abscess, Petit had looked into the literature of this question and found that in ten cases of ulcus serpens, in two of which glaucoma was present, Descemet's membrane was unaffected, while eleven others showed early perforation, and of these last ten had previously shown symptoms of glaucoma. To the presence of glaucoma, therefore, Petit is inclined to attribute a not unimportant influence in the production of early perforation. Wintersteiner, who some time ago described a case of hydrophthalmos with rupture of Descemet's membrane in a child, considers that the absence of any sign of such rupture in the case of adults is probably due to the vast difference in the ability of the cornea to enlarge in the infant and the adult. Since he has not observed any mention of cleavage (such as will be described immediately) in the recorded cases, he believes that for the rupture in the infant or the glaucomatous eye, and in deep abscess of the cornea there must be some totally distinct reason. At the most, one may suppose that the occurrence of glaucoma, or perhaps merely the different condition of tissues consequent upon the more advanced period of life to which the patients have attained, seems to bring about a liability to this posterior abscess and early perforation. Petit propounds the question whether after all there is any necessary and close connection between posterior abscess and early perforation. It is quite conceivable, though as yet it has never been demonstrated, that a posterior abscess might heal up without perforation, provided the ulcer of the cornea which gave rise to it also resolved at an early stage and permitted of this taking place. On the other hand it is not easy to see, as has been indicated above, why rupture of Descemet's membrane should occur unless the deep layers of the cornea were much infiltrated. In many of the descriptions of cases Descemet's membrane is stated to be split up into several layers, but in the author's present case this was conspicuously not so, a difference which he suggests may be at least partly due to the youth of his patient, and besides that, the great majority of the cases examined have been, as already indicated, of longer duration than his.

In elucidation of this point the author gives a very careful description of the condition of the two eyes of a patient, aged 78, whose death occurred while the process of double destruction of the cornea from lagophthalmos was going on; it is no doubt true that this may not be precisely the same thing as an ulcus serpens, but so far as this point at least is concerned, the difference is probably not vital. In the lower fourth of each cornea there was a purulent keratitis with ulceration of the superficial layers, and a collection of pus lying among the deeper layers of the cornea directly posterior to the superficial ulcer; in addition, Descemet's membrane was split into two layers, and between them was a collection of albuminous fluid; there was a slight degree of inflammatory infiltration all round the corneal margin, a little iritis, and a small deposit of cellular and fibrinous exudation in the anterior chamber. This zone of infiltration surrounding the cornea may not be very visible clinically, for in such cases it is but slight and may be completely hidden by the limbus; but a peculiar point about it is that in keratitis from exposure, which of course is manifested at the lower portion of the cornea, this zone is most marked below, and least at the lateral and upper portions of the cornea. The reason for this is that the inflammatory "point of attraction" is situated at a greater interval from those parts of the nourishment-zone, and the stimulus to increased reaction is therefore less. The author has no hesitation about regarding the collection of exudation and cells found in these two eyes posterior to the ulcer in front and lying upon Descemet's membrane as a true posterior abscess in its early stage, chiefly because, unlike the proliferation which is common in ulcers of the cornea, it is sharply marked off by normal corneal structure, and does not fade imperceptibly into normal tissue. If this be conceded, then the condition of affairs described affords us an indication of the method in which the posterior abscess is formed, and in which the rupture of Descemet's membrane occurs. There can be no doubt in one's mind, after examining such a specimen, that the membrane splits into an anterior and a posterior layer, differing, as seen towards the periphery, in colour reactions and in refractive effect, between which lies the exudation; and Wintersteiner is of opinion that the manner in which this arises is by the solution of some uniting medium which normally keeps them in apposition. It is well known that the pus of hypopyon contains but few pus cells, and the author considers that it has very little to do with the splitting up of Descemet's membrane. Certain have maintained that the abscess-like invasions of posterior corneal tissue were the result of the entrance of cells from the hypopyon through an aperture in Descemet's membrane, but in Wintersteiner's cases the fluids in the two situations were quite different in their characters, and there was no perforation. There is thus no reason to doubt the accuracy of the view that the posterior abscess is caused by leucocytes which have wandered into that position from the marginal zone of the cornea, and that perforation takes place from before backwards.

W. G. S.

BOURGEOIS (Rheims). Subconjunctival Injections in the Treatment of Detachment of the Retina. *La Clinique Ophtalmologique*, 16, 1901.

The writer of this paper is strongly convinced of the value of this method of treatment, and communicates the result of his personal experience in support of the views expressed by Jocqs in a recent paper upon the *rôle* of osmosis in the treatment of detachment of the retina. (See OPHTHALMIC REVIEW, 1901, p. 223.) At first the author employed a 30 per cent. solution of chloride of sodium in glycerine, but in spite of the use of abundance of cocaine the pain was so extremely severe that he had to abandon this preparation. In 1897 he reported twelve cases thus treated, in seven of which he obtained marked improvement, an improvement which has been maintained since. He now reports twelve new cases, of which we shall presently give the essential facts very briefly. The solution which he now employs is of the same strength as formerly, but made with distilled water in place of glycerine; the requisite quantity is mixed with a few drops of cocaine solution (5 per cent.), and after the installation of cocaine as for an ordinary operation, one—or half of one—cubic centimetre is injected, under careful antiseptic precautions. He finds it best as a rule to introduce the smaller quantity on several occasions at intervals of four or five days; when a larger quantity is injected, the fluid is apt to make its way into the tissue of the eyelid and alarm the patient much, even if it does no actual harm. His method is to cause the patient to look inwards strongly, to seize the conjunctiva close to the outer canthus, and empty the syringe into the subconjunctival tissues in three portions, directly backwards, then a little upwards, then a little downwards, without withdrawing the needle. As regards the number of times the injection may be repeated, he knows no reason for setting a limit, but says, somewhat *naïvely*, that if there is no effect after a dozen of them he thinks one may as well stop; and as regards the strength of the solution, that mentioned, namely, 30 per cent., he looks upon as the minimum likely to prove effective; for himself, he places no reliance on any weaker concentration. He points out, what must be obvious enough, that so far as the eye is concerned, the major part of each injection must be considered lost, which is of course a reason for repeating the performance just so much the oftener; he has never seen any harm done by it. After an injection it is desirable, but not necessary, that the patient should remain in bed; at all events every effort is strictly forbidden, he must not lower the head or lift any weight. Although using this method now, Bourgeois has not by any means renounced the application of the cautery to the sclerotic, in fact, he often employs the two methods upon one eye. The fine point of the cautery is repeatedly applied to the sclerotic over the area corresponding to the detached portion of retina; these points of cauterisation have, he considers, a two-fold action: they set up an adhesive choroiditis at the spot, which may have the effect of glueing the retina *in situ*, and they leave a filtration scar, by means of which the subretinal fluid may drain away. The twelve cases are as follows:—

(1) Woman, aged 45. In right eye 7 D. of myopia, corrected by a lens. In left eye, vision was "much reduced" by a detachment of a few days' duration, but under treatment with the cautery and injections it rose to $\frac{1}{10}$, and has remained so for four years.

(2) Woman, aged 57. Myopia of 10 D.; corrected

vision was $\frac{1}{4}$ in left eye, $\frac{1}{100}$ in the right, in which there was detachment of the retina. After ten injections vision was $\frac{1}{20}$.

(3) Man, aged 51. The left eye was lost six years ago by an accident; the right had had an extensive detachment for about six months; he could barely see to guide himself. After six injections his vision with —2 D. was $\frac{1}{25}$.

(4) Woman, aged 47. The vision of the left eye was good, but in the right there was detachment of retina. Under injections, vision in the right eye rose from $\frac{1}{100}$ to $\frac{1}{50}$; the presence of partial cataract prevented any further advance.

(5) Woman, aged 32. Good vision in the left eye, but detachment in the right of about a fortnight's duration. In this case treatment proved of little avail.

(6) Man, aged 66. The left eye, on correction of myopia of 1·5 D., had full vision. Detachment in the other eye of several days' duration; he could distinguish the hand at 25 cm. Vision, after eight injections, rose to $\frac{1}{20}$, at which it has since remained (three years).

(7) Woman, aged 35, who had congenital cataract, with myopia of 10 D., but after operation obtained vision of $\frac{1}{4}$; unfortunately detachment of retina came on after a severe exertion, and vision went down to $\frac{1}{100}$. Under treatment by injections it, however, gradually rose to $\frac{1}{8}$, while ophthalmoscopically there was once more no sign of detachment.

(8) Woman, aged 62. In the left eye hypermetropia of 1 D.; in the right, detachment for the last two months, with only finger-counting at 30 cm. After three injections vision was $\frac{1}{8}$. As the author failed subsequently to trace this patient, he puts her on his list as "improved" only, though she was probably cured.

(9) Man, aged 26, in whom detachment followed an injury to the eye from the branch of a tree. Treatment totally failed to have any effect.

(10) A man, aged 56, with diabetes, with whose left eye vision was $\frac{1}{2}$ on correction of low myopia. In the other

eye, in which there was detachment, it amounted merely to perception of light. In this case also treatment was entirely unavailing.

(11) A man, aged 70, with myopia of 3 D.; correction of the right eye gave $\frac{1}{3}$ vision, in spite of some slight opacity of the lens. In the left eye there was a recent detachment with vision of $\frac{1}{60}$. Under treatment it rose to $\frac{1}{20}$, and was still under observation.

(12) Woman, aged 46, myopic to 16 D. In the left eye, whose vision was reduced to perception of light, there was a very recent detachment. After six injections sight rose to $\frac{1}{50}$; she is still undergoing treatment.

To sum up the cases, three may be said to remain after treatment *in statu quo antea*, three to have undergone slight improvement, in five the improvement was very decided, and one was cured. Bourgeois considers, therefore, that we are more than justified in employing this method of treatment, with at least a fair hope of improvement in a certain proportion of cases, of a disease of which the outlook is otherwise very gloomy.[1]

W. G. S.

A. TERSON. The Nature of Acute Glaucoma.

Annales d'Oculistique, *July*, 1901.

It is affirmed by the author that the majority of instances of acute primary glaucoma bear close and striking resemblance to the acute idiopathic œdema which occurs in various organs of the body, but more especially in the pulmonary area. There is similarity also in the mode of production; a diffuse toxæmic condition over the whole body is always present, and this may be either a general infection, such as erysipelas, influenza, &c., or some pronounced diathesis, as rheumatism or gout. The presence of hypermetropia is supposed to have additional bearing on the tendency of this form of glaucoma to arise; and it is pointed out that since the diathesis as well as the hypermetropia may be a hereditary condition, the coincidence of acute primary glaucoma occurring in several successive generations is the less remarkable.

In addition to the two predisposing causes as stated, there is a third potential factor necessary to produce the local hypersecretion, or intense serous outpouring and consequent œdema, which constitutes the state of acute primary glaucoma. This participant cause is usually some transient excitement of a nervous or reflex emotional nature; and it is for this reason that the disease principally occurs in subjects with a neuro-arthritic tendency.

The intense local hypersecretion disturbs the equilibrium of the vascular mechanism of the eye, and the only positive relief and improvement afforded is by the performance of a scleral iridectomy. This nullifies the superinduced strangling action of the iris, and permits the natural efferent channels again to resume their function. The author mentions that he has found the blood-tension in this form of glaucoma to remain normal, whilst in the subacute and chronic varieties its degree is increased, which may be due to the presence in the latter of a general arterial sclerosis.

Reference is made to several of the theories which have been put forward from time to time in explanation of the exact nature of the mechanism involved in the production of the serous exudation and local œdema, but the question still remains open to discussion.

With regard to prophylaxis and treatment, special attention to general health and hygiene is advocated, with the view of combating, as far as possible, the existing predisposition or diathesis; this is in addition to the ordinary measures usually adopted.

KENNETH SCOTT.

E. PFLÜGER (Berne). Subconjunctival Injections of Hetol. *Archives d' Ophtalmologie, July*, 1901.

In spite of all that has been said against such treatment, and notwithstanding its failure in the hands of many surgeons, Pflüger expresses his firm conviction of the real value of the subconjunctival injection of iodide and chloride of sodium (2 per cent.) in cases of chronic choroiditis, whether central or peripheral, and more especially in progressive myopia associated with choroidal lesions at the posterior pole, lesions which are often found completely to encircle the disc. Vitreous opacities can often be made to disappear under this treatment also. He still frequently combines with this injection tapping of the aqueous, a manœuvre which greatly heightens the effect of the injection, especially in cases of myopic astigmatism. Entirely contrary, as he confesses, to the experience of other surgeons, Pflüger feels great confidence in the improvement of astigmatism by surgical interference. His results have been so satisfactory that he regards operation as distinctly called for in cases of progressive myopia along with astigmatism. Subconjunctival injections of chloride of sodium in more concentrated solutions (4 or even 10 per cent.) are highly spoken of by him, for example, in detachment of the retina, whether alone or combined with other modes of treatment, and he employs such with confidence, although confessing that the injection causes very severe pain. He has been on the watch for any other substance, lymphogenous also, but active in weaker dilution and therefore less painful in application than chloride of sodium, and Landerer's description of his success in the treatment of tubercle by intravenous and intramuscular injections of cinnamate of sodium (to which the name of hetol has been given) drew his attention to this substance.

Landerer states that injections of hetol produce (1) a leucocytosis, very vigorous in the intravenous injection, much less so in the intra muscular, and (2) an aseptic inflammation round any focus of tubercle, with penetration of the mass by the leucocytes which surround it in great numbers. The new formation of elementary tissue thus caused leads to the absorption of caseous masses, which gradually give place to solid connective tissue. It is to be expected, therefore, that it is in the domain of the tubercular affections of the eye that this treatment is likely to be most thoroughly tested, but it may be found of service in any condition in which an artificially provoked leucocytosis is capable of hastening a good result.

Landerer having shown that hetol was not a substance likely injuriously to affect the tissues of the eye, Pflüger has tested its value in a number of conditions, and gives the following account of his results:—

(1) In herpes corneæ, a disease which he says he finds to have become much more frequent in the last ten years, injections of hetol fulfil two important indications, for they greatly ameliorate the pain, and they assist and hasten the reparation of the tissue affected. He has thus treated eighteen cases of corneal herpes, varying in precise locality and in severity, and has observed a great difference between the course of the disease as treated with hetol and as treated with other remedies. Herpes corneæ is a disease very troublesome from its long duration and the weakness of any tendency to sound healing; but the calmative influence of hetol was found to be most marked; whether or not that be attributable, as he suggests, to some action upon the toxins which are the cause of the keratitis and the iritis. This effect can only be peripheral on the nerve terminations, and cannot have any influence on the Gasserian ganglion or on the cells of the spinal cord, in both of which situations alterations have been proved to exist in cases of herpes corneæ. It is not at all advisable, however, in Pflüger's judgment, and perhaps because of this very fact of the ganglionic alterations, to omit such more familiar treatment as salicylate of soda internally and warm applications locally. In certain more unusual forms of herpes, namely, filamentous and dendriform keratitis, hetol is not less valuable than in the commoner variety.

(2) Deep ulcers of the cornea, especially when these are situated near the centre, whether they be traumatic or pustular in their origin, are favourably influenced by hetol also.

(3) Anterior uveitis, in its various forms, and when accompanied by the most diverse complications, reacts well to treatment with hetol. Certain forms of interstitial (parenchymatous) keratitis, acute and chronic, are

apparently apt to follow upon some inflammatory affection of the lungs and bronchi, and have therefore been styled catarrhal; some appear to be rheumatic in their origin, while of the causation of others we know nothing. During the course of such a keratitis, one sees now and again vesicles forming on the cornea, iritis, and serous irido-cyclitis with deposits on Descemet's membrane. These affections are probably due, says Pflüger, to the influence of toxins secreted by the microbes whose aperture of entrance has been by the perspiratory passages, and in all of them, whether acute or chronic, hetol, especially when the injections were followed up by massage of the cornea, has proved to be a valuable therapeutic instrument. In cases, however, in which irido-cyclitis is not complicated by corneal mischief, the value of hetol seems to be much less.

(4) In parenchymatous keratitis of traumatic origin, such as occasionally is seen to arise after a trifling injury in a person in apparently good health, the treatment is stated to have been useful. Some of those cases the author considers to disclose a latent tendency to tubercular lesions. Distinctly tubercular kerato-uveitis is particularly amenable to treatment by hetol; pure iritis of tubercular origin is very rare, for there are almost invariably nodules in the ciliary body as well, which may be seen encroaching upon the angle of the anterior chamber. This fact renders treatment by iridectomy quite useless, though it is frequently attempted, for operation cannot possibly remove the evil. Conservative treatment, aided by hetol, is more rational and more satisfactory.

(5) Injections of hetol have given the author the highest satisfaction in obstinately recurring cases of scleritis, with opaque invasion of the cornea. Of this and of certain of the other conditions mentioned, Pflüger briefly relates the history of a few cases.

His method of using the drug is that every second day 4 to 5 cubic centimetres of a 1 per cent. solution were injected; with a pad of absorbent cotton the patient then carried on massage very gently for a few minutes. The pain occasioned by the injection, so great with certain substances, was perfectly trifling in degree.

W. G. S.

E. Lilienfeld (Prague). The Mydriatic Action of Pilocarpin Solutions. *Centralblatt für praktische Augenheilkunde, May and June*, 1901.

The author's attention was first drawn to the subject by the fact that this action revealed itself in the case of one of his patients, who was using pilocarpin to ward off glaucomatous attacks. As a preliminary measure, any possible contamination of the solution used by the patient with any of the ordinary mydriatics was absolutely excluded. Next, exact observations bearing on the chemical constitution and physiological properties of this and other samples of pilocarpin salts as met with in the market, were instituted.

When the action of the suspected solution was tested on the normal human eye, a temporary myosis gave place within three-quarters of an hour of instillation to a marked dilatation of the pupil, accompanied by a slight loss of accommodative power. The reaction to light was lost at the height of the mydriasis. The mydriatic effect declined gradually after a few hours, but a difference in the size of the pupils could be detected as late as the third day. A few drops of eserin solution instilled during the period of maximum dilatation rapidly produced a myosis, showing that the dilatation had not been produced by atropine, the action of which would not of course have been so readily overcome by the eserin.

When tested on the frog's heart, paralysed by muscarin, two drops of the pilocarpin solution sufficed to start the heart beats anew, thus proving beyond question that the solution contained some substance possessing the well-known atropine action. This substance is identified by the writer as identical with the substance "jaborin," described by previous investigators in the same field, who had also noted the mydriatic action. It is supposed to be an isomer of pilocarpin, and ought to be separated from the latter in the process of crystallisation, but in the ordinary preparations of pilocarpin "jaborin" usually occurs as an impurity and in sufficient quantity to make its mydriatic action powerfully felt. The action on the frog's heart, antagonising muscarin and re-establishing the cardiac systole, is the most reliable way of detecting its presence in very minute traces. Traces discoverable by this test may not, however, have sufficient power to influence appreciably the myotic action of the pilocarpin solution in which they are found.

Thinking that possibly the age of the solutions employed might have an important bearing on their physiological action, Dr. Lilienfeld made careful observations to determine this point.

In solutions four weeks old he noticed a distinct weakening in the myotic action of the drug, and especially about thirty hours after instillation, the occurrence of slight mydriasis. He, however, did not see from the use of old solutions any mydriatic effect comparable to what was noted in the case of the solution originally tested. He is therefore at a loss to explain why this solution contained so large an amount of some impurity possessing the atropine action. He also found that the sterilisation of pilocarpin preparations by boiling did not lessen in any way their myotic action. On testing a 1 per cent. solution of so-called "jaborin," he found it to produce at first a slight myosis, which in one and a half to two hours after instillation was succeeded by a slight mydriasis lasting about twenty-four hours. Accommodation and the pupillary reactions remained undisturbed. Jaborin is not to be looked on as a definite single compound, but a mixture of pilocarpin with closely allied alkaloids, isopilocarpin, &c. The writer concludes with a suggestion that the pilocarpin preparations sent into the market should be first subjected to careful physiological tests, a guarantee of supposed chemical purity not being a sufficient safeguard.

J. V. PATERSON.

M. SACHS and **J. MELLER** (Vienna). **The Optical Orientation with the Head inclined towards the Shoulder.** *V. Graefe's Archiv für Ophthalmologie, lii.*, 3.

The question of orientation when the head is bent towards the shoulder has principally been approached in connection with that of the so-called compensating rotation of the eyeball. This compensating rotation was never admitted unreservedly until Javal had demonstrated its existence beyond dispute by the fact that a cylinder glass which corrected his own astigmatism in the normal position of the head failed to do so when the head was inclined towards the shoulder; the cylinder had then to be turned in the opposite direction to correct his astigmatism.

The influence of such various inclinations of the head towards the shoulder on the orientation can be examined both by the apparent deviation of a line that appears vertical in the normal position of the head, or by finding out the position of a line that appears vertical for the various inclinations of the head.

The former method was the one principally employed by the authors. The experiments were carried out in a dark room by means of a line of light which could be turned in a plane parallel to the face of the examinee. This line of light could be made visible either in a sudden flash or as a steady light. The head was fixed by a bit placed between the teeth that admitted of a suitable rotation, and by a special arrangement the position of the line of light could be registered. It was found that the answers as to the exact position of the line became more uncertain the longer the line was left visible, and the results of the examination with momentary flashing illumination were therefore considered to be the more reliable.

In binocular examination the light was often seen as two separate lines, and this led to the employment, in most instances, of monocular examination, which gave the following results.

The answers were given with great precision in every position of the head. In inclinations of the head under

50° the apparently vertical line deviated from the vertical, with its upper end towards the inclined head. In inclinations of the head of more than 50° the apparently vertical line deviated in the opposite direction. Only a very small arc separates the area within which the line appeared with its lower end inclined to the right from the area in which it appeared inclined in the opposite direction.

The amount of deviation is proportionate to the inclination in all cases in which the latter exceeds 60°.

The results obtained on different days were not always the same, even when all other conditions of the experiments were identical.

On analysing the question how far the counter-rotation of the eye has any bearing on the localisation when the head is turned towards the shoulder, the authors derive from their flash-light experiments the conclusion that in small inclinations of the head the counter-rotation helps to increase the errors of localisation, and in inclinations of a greater angle it is not sufficient to neutralise these errors. Experiments with after-images lead to exactly the same results.

K. G.

J. MELLER (Vienna). Epithelial Ingrowths and the Formation of Cysts in the Eye. *V. Graefe's Archiv für Ophthalmologie, lii.*, 3.

Cysts of the iris are either congenital or of traumatic origin. Of the traumatic "serous" iris cysts three different types can be distinguished: (1) Those in which the cyst is everywhere surrounded by the tissue of the iris—*iris cysts* proper; (2) those in which the cyst is only partly situated within the tissue of the iris, and partly in the anterior chamber, so that the angle of the iris and the posterior surface of the cornea form the anterior boundary of the cyst—*iris-chamber cysts;* and (3) those in which the cyst has only so far to do with the iris as the latter forms part of its boundary wall—*wall-chamber cysts* proper.

The present paper deals with the microscopical examination of several cases, and contributes thereby additional proof of the correctness of Stölting's view that the origin of these so-called iris cysts has to be sought for in the proliferating intrusion of the corneo-conjunctival epithelium along the margin of a perforating corneal wound.

This intrusion of corneal epithelium does not generally extend very far, and but rarely reaches the deeper layers of the cornea. It disappears, as a rule, by being pushed out again by the process of subsequent cicatrisation. In some rare instances, however, it advances along the lips of the wound right into the anterior chamber on to the posterior surface of the cornea and the anterior surface of the iris. As an example of the rapidity with which this occurs, a microscopical drawing is given of a case where death from delirium tremens followed four days after an iridectomy, and where the whole thickness of the corneal wound was coated with newly-formed corneal epithelium.

This origin of the iris cysts by direct proliferation of the epithelium is *a priori* more probable than by growth of isolated epithelium detached by some violent cause and implanted into the iris. It has also been observed in experimental implantation that the implanted pieces grow at first but completely disappear later on.

When the epithelium has once entered the anterior chamber by coating the wound in a tubular manner, the healing of the corneal wound is sufficient to form in the interior of the eyeball a closed cavity lined with epithelium —a regular cyst. The epithelium tube in the cornea itself can disappear under the process of cicatrisation, and in such a case the connection between the epithelium of the corneal surface and the cyst disappears completely.

An excellent case in illustration of this is given with microscopic drawings. It is very interesting to see how there, under the altered conditions of growth and pressure, this epithelium has changed into a compound cylindrical epithelium in some parts, while in the anterior chamber it has the characteristics of the epithelium of a mucous membrane, viz., goblet cells and gland-like protrusions into the fibrous substratum.

A large number of coccidia had immigrated into the anterior chamber with the epithelium, and proved by their plentiful occurrence how suitable and nutritive a soil the young epithelium was for them.

K. G.

FRENCH SOCIETY OF OPHTHALMOLOGY.

SEPTEMBER MEETING—M. DARIER, in the Chair.

Hypertrophy and Displacement of the Lachrymal Gland.—M. Terrien divides cases of this condition into the traumatic and the non-traumatic. Instances of the first variety seem to be extremely rare, for Ahlström succeeded in collecting only five. The second variety is also exceedingly uncommon ; it has sometimes been symmetrical. Terrien related the case of a girl, aged 15, who came complaining that the right upper lid had been hanging down more or less for two years. Even at the time of examination there was no more than 1 mm. of difference in height between the two upper lids, except when the patient looked up, when it became more marked. The skin of the lid formed a transverse fold which was almost in contact with the cilia, this fold lying inclined somewhat downwards and outwards, and the whole presenting an appearance closely resembling senile ptosis. A mass, which was certainly the lachrymal gland, could be distinctly felt through the skin, and even, to a less degree, in the left upper lid, which, however, looked quite normal, so that apparently both glands were a little hypertrophied. There was no undue lachrymation. There was no general enlargement of glands, she had never had mumps, but the tonsils were rather large. Except in being unilateral, the case presented certain of the features of blepharochalasis.

Mules' Operation.—M. Valude exhibited a patient on whom he had performed this operation, in praise of which he expressed himself very warmly.

M. Kalt had not been so happy in his experience of the operation ; he had seen a hæmorrhage take place into the sac and give trouble by becoming septic. He dreaded lest the presence by the foreign body in the ocular cavity should give rise to sympathetic troubles.

M. Chevallereau preferred evisceration, which he always performed in preference to enucleation when panophthalmitis was present. He did not remove the cornea, but merely incised it, and emptied the globe with a Volkmann's spoon. He had a high opinion also of Mules' operation.

M. Valude's experience had been that the glass globe was well retained, even after the lapse of many months, if not longer. He had tried other substances than glass, such as sponge, bone, and charcoal, but had been very far indeed from pleased with the results thus obtained.

Glaucoma following on Albuminuric Retinitis.—M. A. Terson had seen several cases of this unusual condition, and desired to draw attention to the extremely satisfactory action of dionine in it and in hæmorrhagic glaucoma in general. He related the case of a lady, aged 60, whose sister and brother had died of Bright's disease. She herself had a high tension pulse and albuminuria, and the fundus showed typical albuminuric retinitis. He saw her some time later with a very typical glaucoma with hæmorrhages in the left eye; for this he did not dare to perform iridectomy, and fell back on myotics. Eserin, however, was badly borne, and even pilocarpin gave little relief to the pain and other symptoms. Without discontinuing the pilocarpin he next added dionine in 2½ per cent. solution, which produced immediate benefit; the pain vanished, the hyperæmia of the globe passed away, and the tension fell.

M. Darier had been very much pleased with the action of dionine in hæmorrhagic glaucoma and in iritis also. One disadvantage of dionine was that a condition of tolerance was apt to be acquired, when it of course lost all effect. As regards corneal conditions, the beneficial analgesic action of dionine was, on this account, chiefly to be observed in the acuter forms.

Retinitis limited to the Macula.—M. Kalt exhibited a case of exudative retinitis, in which the macula alone was involved. The patient was a man, aged 60, who came complaining of bad sight in the left eye. On examination the disc was found normal or perhaps faintly blurred at its margins; its vessels were quite normal. At the macula there was a circular patch of a uniform greyish-white colour, whose diameter was slightly larger than that of the papilla. There was no development of pigment, and outside the area the fundus looked quite healthy. At the temporal side of this patch two short white streaks were seen, in direct continuity with its margin, but in other respects it looked exactly like an accessory disc from which the vessels had disappeared. At its nasal side the sharpness of its margins suggested the aspect of a glaucomatous cup, and two small veins passing in there and forming an abrupt elbow as they did so, served to increase the illusion. The patient had an absolute central scotoma, but was able to count fingers peripherally. The symptoms had begun a couple of years before with misty vision and photopsiæ; sight had failed at that time with great rapidity. It appeared as though the lesion, which had probably been an exudation, subsequently absorbed, had filled up the whole of the macular depression, whose bright margin is so noticeable a feature in certain young subjects.

INTRODUCTION TO A DISCUSSION ON THE DIAGNOSIS, PROGNOSIS, AND TREATMENT OF PERNICIOUS MYOPIA.[1]

BY PRIESTLEY SMITH, F.R.C.S.

WE know by experience that myopia in many persons is an innocent condition, which continues through many years without much change, causing some inconvenience it is true, but not leading to disaster of any kind. We know, on the other hand, that in some persons myopia is a pernicious condition, which reaches a higher and higher degree as time goes on, is accompanied by damage to the tunics of the eye, and leads sooner or later to serious impairment or loss of sight. By what means, and to what extent, can we distinguish between these different forms of the disorder in their early stages? What can we do to arrest or hinder the progress of a pernicious myopia? These are the practical questions which we have been invited to discuss.

The accompanying chart demonstrates several important points, and I will ask your attention to it at once. It shows the changes of refraction which occurred during periods of five years and longer, in 100 cases of myopia observed by myself. The cases were taken consecutively from my private case books, and were not selected in any way beyond this: only

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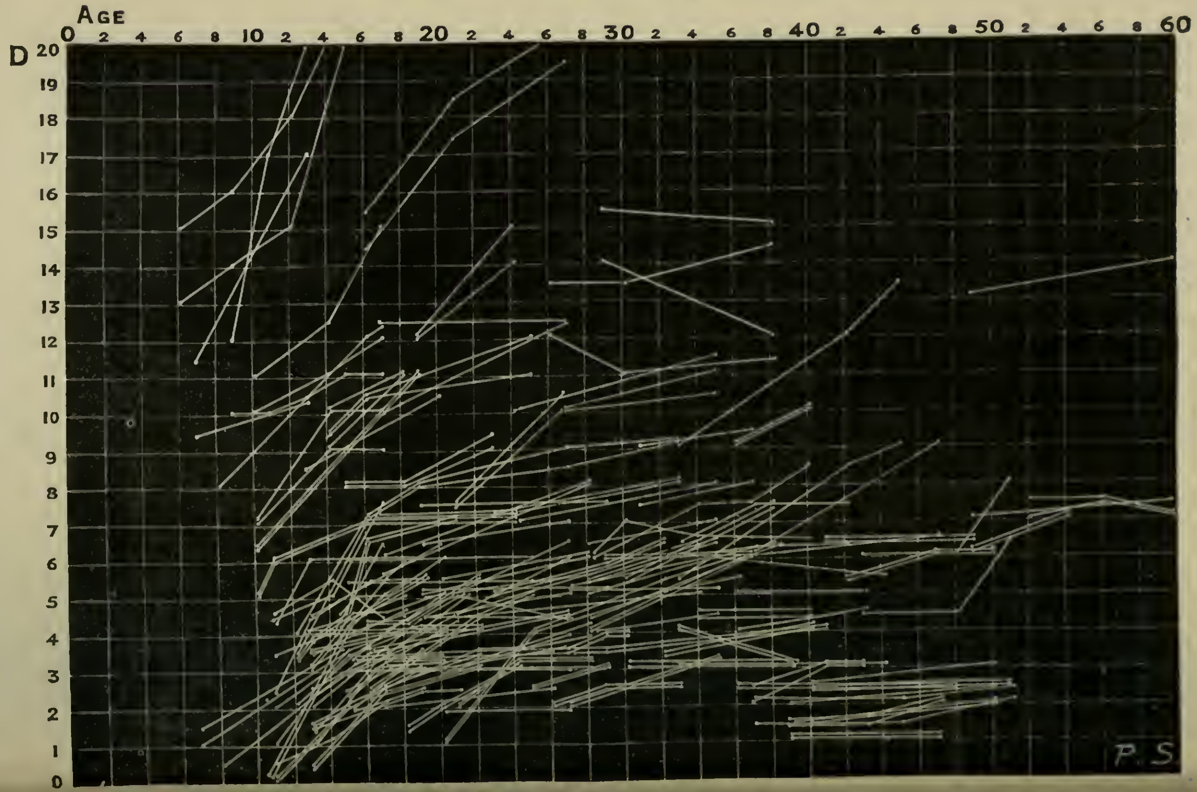
[1] Read to the Ophthalmology Section at the Annual Meeting of the British Medical Association, 1901.

100 CASES OF MYOPIA (200 eyes).

PROGRESS DURING PERIODS OF AT LEAST FIVE YEARS.



those cases were used which had a myopia of at least 1 D., which were free from disease of cornea, iris, and lens, and which had been examined at least twice with an interval of five years; many of the cases covered much longer periods. The refraction was determined by the shadow test and Snellen's letters, usually without atropine. Errors due to spasm of accommodation are present no doubt to some extent, but are probably small, for in my experience the results given by the shadow test in myopia are seldom much altered by using atropine. Where there was astigmatism the mean refraction is taken as the grade of the myopia. Both eyes were myopic in every case, so the chart represents 200 eyes. It shows in each case the age of the patient and the grade of the myopia at each examination.

By some authorities, innocent and pernicious myopia are sharply distinguished from each other as two essentially different conditions, just as in some works of fiction the good people are sharply distinguished from the bad. In neither case, I think, is the distinction true to life. In myopia, as in human nature, we find, between the two types, innumerable grades, variations and combinations, among which there is no place for a dividing line. There are many cases of myopia which cannot be classed forthwith as innocent or pernicious. In attempting to predict their course we have carefully to consider many factors and many possibilities. The chief data on which any forecast must be based are, I think, the following:—

(1) The age of the patient.
(2) The grade of the myopia.
(3) The condition of the choroid and retina.
(4) The constitutional condition.
(5) The evidence relating to heredity.
(6) The occupation of the patient.

I propose to deal briefly with each point, and must speak dogmatically, for the time will not permit of cautious qualifications and reservations. I hope by so doing to provoke the more discussion.

(1) *Age.*—Other things being equal, the younger the patient the more likely is the myopia to increase in degree. In childhood and early youth myopia is rarely stationary. It usually increases during the period of bodily growth, and the rate of increase diminishes with the approach of adult life. In a large number of cases, perhaps in a majority, it comes to a standstill between the ages of 15 and 25; age alone, however, justifies no inference.

(2) *Degree of the Myopia.*—Other things being equal, the higher the myopia the more likely is it to increase. For example, if fifty children, all of one age, have various degrees of myopia, the future increase of their myopia will, on the whole, be greater among those who are more myopic than among those who are less myopic. The same rule holds in adult life, but for all degrees of myopia the probable future increase is less than in early life. It follows that a high myopia in a child is of very evil augury. A child who has 10 D. when he is 10 years old is likely to have 20 D. when he is 20. Fortunately such cases are rare. In adults we can form no forecast even from the grade of the myopia and the age taken together, unless we take also into account the actual state of the choroid and retina.

(3) *Condition of the Choroid and Retina.*—The average vision of myopes sinks as the grade of the myopia rises. Richardson Cross[1] has given striking statistics on this point. The higher grades are to be feared far less for the error of refraction, which glasses can correct, than for the loss of vision due to choroidal

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[1] Richardson Cross, *Brit. Med. Journ.*, 1896, vol. ii., p. 633, and *Nagel's Year Book*, 1896, p. 424.

and retinal changes, for which there is no remedy. In general these changes vary in gravity with the grade of the myopia, but they bear no fixed proportion to it. With equal grades of myopia they are more extensive in the older persons than in the younger. A child with a myopia of 8 D. may have little or no choroidal change, but we must not regard him as permanently exempt; it is likely to develop later. An adult with 8 D. will generally show considerable choroidal change; should he exceptionally show none, he is safe—at any rate, much safer than the child.

What is the essential nature of these changes? They are, in their usual order of occurrence, first the typical myopic crescent, then the more diffuse and patchy thinning of the choroid in the adjacent region, then pigmentary and hæmorrhagic changes in the retina at or near the macula, and in some cases detachment of the retina. The nature of the crescent is beyond dispute; it is due to stretching and displacement of the choroid in relation to the disc brought about by yielding and extension of the sclera. Weiss[1] and lately Heine[2] have demonstrated the fact of this displacement by traction in the clearest manner. The more diffuse changes which occur later appear to be due to further stretching, accompanied by vascular and degenerative changes in the damaged membranes, but this statement does not cover the whole ground. In certain cases myopia developes rapidly in connection with obvious inflammation of the choroid, as in some cases of syphilitic choroiditis. Here the choroiditis seems to be the primary disorder, the yielding of the sclera the consequence. Further, in the region of the posterior staphyloma we find on dissection that the choroid and sclera are abnormally adherent to each other. Here is evidence of sclero-choroiditis. Is myopia, then, in general, a result of an insidious choroiditis? Apparently not, for in the earlier stages there is usually no discoverable inflammation, and there is no retinal damage such as we should expect if the underlying membrane were inflamed. On the other hand it is clear that congestion and inflammation do play an important part in certain stages and certain forms of the disorder, and chiefly in the pernicious forms. To what extent the yielding of the sclera and the vascular and degenerative changes in the choroid and retina depend on constitutional causes, rather than on the mechanical effects of muscular action, dragging on the optic nerve, pressure of the orbital contents and so forth, is an important question.

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[1] Weiss, "Report of the 17th Meeting of the Heidelberg Ophthalmological Society," 1885, p. 138.

[2] Heine, "Report of the 27th Meeting of the Heidelberg Ophthalmological Society," 1898, p. 324.

(4) *Constitutional Condition of the Patient.*—We all see cases in which a rapidly progressive myopia is associated with malnutrition from one cause or another. Nettleship,[1] speaking of myopia, says: "General enfeeblement of health, as after severe illness or prolonged suckling, seriously increases the risk of its progress, even after middle life." Wray[2] found in several cases that where one member of a family had a high myopia, while the brothers and sisters had none, the myope had suffered from protracted infantile marasmus, the others not. Schwabe,[3] from extensive observations in Leipzig, concludes that men and women acquire high myopia with equal frequency, but at all ages the reduction of vision is greater in the women than in the men. The complications of high myopia, he says, are twice as common in women,

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[1] Nettleship, "Diseases of the Eye."

[2] Wray, OPHTHALMIC REVIEW, 1897, p. 359.

[3] Schwabe, *Nagel's Year Book*, 1894, p. 147.

and begin to appear in the lower grades, 6 to 10 D., while in men they are uncommon under 10 D. He attributes the difference to the greater liability to illness in women, their lack of exercise in the open air, and especially as regards the graver complications, to the climacteric. I may here repeat a suggestion made at one of our annual meetings eleven years ago, that the yielding and deformation of the sclera in some forms of myopia is analogous to the yielding and deformation of the bones in rickets. Special attention to the question has been given by Batten.[1] He has advanced evidence to show that the development of myopia is frequently connected with chronic constitutional disturbance, and especially with high arterial tension ; but of his observations I will leave him to speak. It is clear that constitutional disease may be a factor in any case of myopia ; it may account for the abnormal yielding of the sclera ; it certainly often aggravates the morbid changes in the choroid and retina.

(5) *Evidence Relating to Heredity.*—The tendency to myopia is very frequently hereditary. Some observers hold that inherited myopia is commonly an innocent disorder, while the non-hereditary forms are usually pernicious. Have we statistics in proof of this ? It would be difficult to obtain them, for we cannot exclude heredity merely by examining the father and the mother. Moreover, at the time of life when the complications of high myopia chiefly occur the patient is not likely to bring his parents with him. They are probably inaccessible. Hereditary or family myopia, even of high degree, is sometimes of remarkably innocent type. MacLehose[2] has published a striking instance of this. But heredity confers no immunity

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[1] Batten, OPHTHALMIC REVIEW, 1892, p. 1.

[2] MacLehose, OPHTHALMIC REVIEW, 1897, p. 207.

from pernicious complications. I know a family where the father has myopia of 10 and 6 D., and two daughters have each lost the use of one eye through complications of high myopia which occurred during adult life. The other sons and daughters are all, or nearly all, free from eye trouble. No doubt it is better to have a myopia inherited from one's parents and an otherwise sound organism, than a myopia acquired for oneself by reason of debility or disease, but we must not pronounce a myopc to be safe simply because his parents were myopic before him.

(6) *Occupation.*—The future of many myopic eyes depends on the way in which they are used. Prolonged and habitual close work does harm. We see the effect in overworked school-children, clerks, schoolmistresses, literary men, seamstresses, jewellers, typesetters, and others. We see it, not only in the greater prevalence of complications among such persons, but in individual cases. Excessive close work in early life is often accompanied by rapid increase of refraction ; in later life it often aggravates the graver complications. Patients who must, or will, continue such work in excess, especially those whose working distance is already too short and who decline to lengthen it by the aid of glasses, are encouraging their myopia to run a pernicious course. The amount of risk must be estimated from the grade of the myopia, the age of the patient, and the amount of choroidal change already present. To give a bad prognosis, by way of warning, is sometimes the best or only way to prevent its fulfilment.

Time forbids me to enter upon the question of treatment, and I have no desire to do so, for I had my say on that subject at the Annual Meeting of our Association, held in Birmingham, in 1890,[1] and have little to add at the present time. I will only repeat one leading principle, namely, to suspect every myopia, and especially every youthful myopia, of a tendency to increase, until time has proved it to be stationary ; to be doubly suspicious in presence of congestion or atrophy ; and to re-examine at intervals of six months, twelve months, or longer, according to the nature of the case. Only in this way can we decide on the rational measures of precaution which are needed in each case and which are the essence of treatment. We can do far more important service to our short-sighted patients, if they will let us do it, by helping them to avoid a pernicious development of their disorder, than by any attempt at remedial treatment after the fact.

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[1] OPHTHALMIC REVIEW, 1890, pp. 313 and 345.

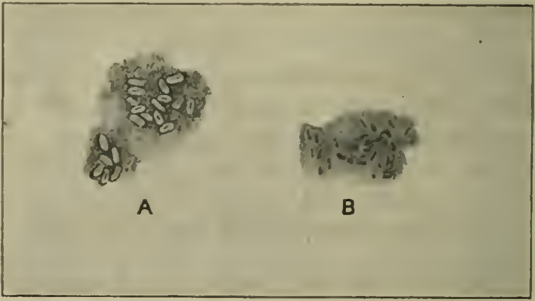
SUPERFICIAL PUNCTATE KERATITIS ASSOCIATED WITH AN ENCAPSULED BACILLUS.

By H. Herbert, Major I.M.S.

In September, 1900, about the close of the rainy season, a form of superficial punctate keratitis was found to be common in Bombay, and in the cold and early hot weather it was still more prevalent. In the four months, January to April, 1901, 226 cases attended the out-patient department of the Cowasjee Jehangir Hospital, being 4·7 per cent. of the total attendance. During May, our hottest month, the proportion dropped, and the corneal eruptions became as a rule less copious. I cannot say whether it is a new disease here ; much more probably it formerly was present, but passed unnoticed.

Clinical features.—Only the facts which seem specially noteworthy, in comparing this type of the affection with the text-book descriptions, will be mentioned.

(1) The spots on the cornea are minute and scarcely at all opaque, so that they are not easily seen until stained with fluorescin. Their usual effect is to give merely a slightly rough surface to the cornea; the spots appear a little elevated. When the surface is partly dried by exposure some of the dots, probably recent formations, remain as elevations, whereas others, probably older ones, are found to be really minute depressions, ordinarily more than filled up by lachrymal fluid. The general surface is found also to be very uneven from coarse physiological pitting (see a paper before the Ophthalmological Society in March of this year). Occasionally one or more spots which stain with fluorescin are to be seen on the limbus of the conjunctiva; more rarely there are a few similar spots or a small patch or streak on the upper tarsal conjunctiva. Towards the close of the case the eruption tends to be confined to the centre of the cornea,



Encapsuled bacillus—borax methylene blue and eosin. × 500.

A. Capsules distinctly shown, bacilli faint; B. A portion of the same specimen containing more of the methylene blue, bacilli fairly well stained, capsules scarcely seen.

the space occupied daily growing less, and in cases where the dots are very numerous they are often mostly collected into a boundary zone or ring, enclosing a space broader horizontally than vertically, and situated nearer the lower than the upper margin of the cornea. After the eruption has disappeared a faint cloudiness of the epithelium may be left for a few days. In the terminal state of cases in which the dots have been few and scattered, one may find a patch showing the fluorescin stain; this may be rounded about 2 or 3 mm. in diameter, or more often forms a straight or slightly curved line 3 to 6 mm. long, which changes its position daily; occasionally there are two such fluorescin streaks. The duration of the case is commonly two to three weeks.

(2) The characteristic thickening of the limbus conjunctivæ, with usually very moderate ciliary and conjunctival injection, is often in itself almost sufficient for diagnosis. But it varies much in degree, and may be quite absent. On the whole it appears to correspond rather with the amount of associated conjunctivitis, than with the state of the cornea.

(3) The conjunctivitis varies also very much in amount and character. Culture experiments (see p. 344) show that it may be associated with various pyogenic organisms, quite apart from the special corneal microbe. Very often towards the end of the keratitis, there is found a presumably recent formation of quite small follicles, especially along the upper border and at the two ends of the upper tarsus.

(4) Occasionally both signs and symptoms are extremely mild, and the cases could not be diagnosed were it not that a barely perceptible ciliary injection leads one to use fluorescin, which may reveal a fairly copious eruption.

(5) One of the most striking features of the disease is its almost invariable limitation to one eye. I have

only once seen both eyes typically affected and that patient had subacute trachoma also. In another case the second eye became very mildly attacked (a few spots only), while the eye first to be inflamed was recovering. Nor does it appear to spread in families, and no association with nasal catarrh has been noticed.

(6) It is an affection chiefly of young adult life. Of decennial periods, 20 to 30 is the age most prone; over two-thirds of the cases fall between 20 and 40 years. It was not seen in quite young children, and was very rare over 50 years. Both sexes are attacked almost equally,[1] judging from the proportions as compared with those of the general attendance.

Bacteriology.

(1) In *epithelial scrapings* from the affected corneæ are found bacilli distinguished by two main characters, (1) enclosure within very distinct capsules, and (2) the possession of very feeble staining affinities. In smear preparations a light counter-staining with eosin, after methylene blue, leaves the capsules in the thinner bits of tissue colourless, sharply defined, more or less regularly elliptical, following the contours of the contained organisms. The average measurements of a group of capsules kindly taken for me by Dr. Surveyor were $3{\cdot}2\ \mu$ long, $1{\cdot}6\ \mu$ broad. It will be necessary to find a good staining method for the bacillus before it can be clearly described. It does not retain the colour by Gram's method. Methylene blue and eosin are very useful in searching for the capsules and organisms, but the latter are left usually only faintly and irregularly coloured. The bacillus

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[1] The proportion of patients showing this condition was almost 75 per cent. males to 25 females, but this is only 4 per cent. higher than the male proportion in the general attendance.

appears on an average about twice as long as broad; it often seems to taper slightly towards its ends, which are rounded, and it is sometimes a little curved. It is generally single; there appear only a few paired organisms, short, more like cocci. In smear preparations the organisms often appear to be in the epithelial cells, though probably they lie merely in plasma on and beneath the cells; there is very little infiltration with wandering cells. The bacilli are very unevenly distributed, for the greater portion of the epithelium is quite free from them, and where they are found they are generally packed together in large numbers. This very uneven distribution, added to the feeble staining powers of the microbe and a difficulty in getting the epithelium thinly spread out on the slide, makes the search for the bacillus uncertain and perhaps disappointing, unless confined to well-marked cases of the disease, with numerous closely grouped corneal lesions.

The following considerations point to it as the cause of the keratitis:—

(1) In the first place the definite and regular clinical history, and the progress of the eruption over the corneal surface, suggest the operation of a pathogenic micro-organism.

(2) The intimate association of this bacillus with the epithelial cells corresponds with the mildness of the inflammatory reaction and the very small amount of infiltration.

(3) There is a distinct relation between the very uneven distribution of the organism in the epithelium and the punctate character of the affection clinically.

(4) Finally and chiefly, it is the only microbe found regularly[1] and in any quantity. In addition there are

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[1] In two or three instances out of at least two or three dozen examinations the organism was not found, and in other attempts one group only

often to be seen a few scattered bodies which may possibly be either sporozoa or blastomyces, but with no particular distribution.

(2) *Culture experiments.*—Many attempts have been made to grow the organism, and apparently without success. Either it has not grown, or it has been swamped by other microbes. Ordinary agar has been chiefly used; also blood-smeared agar and broth. Besides a number of cocci and xerosis bacilli, at one time, in the early hot weather, the bacillus pyocyaneus was so frequently grown from the affected corneæ that it was thought that possibly this well-known pyogenic organism might in the corneal epithelium acquire a capsule and be the bacillus above described; lately, however, it has not been found. At least two other bacilli, not yet investigated, have been grown also. It is likely that these organisms, if pathogenic, have to do with the associated conjunctivitis only, like the cocci and the pyocyaneus; for recently a strip of affected epithelium, after lying on agar for five days without showing any growth, was examined and found to contain numbers of the special bacilli apparently degenerate, they were shorter and stained very irregularly, capsules nearly circular. The epithelium had been, however, taken from a cornea in the later stages of the affection. From another earlier case, epithelium was examined after lying one day on agar; the encapsuled bacilli did not appear to have changed in any way—to be losing their capsules, for instance—or to show more signs of division.

(3) *Inoculation experiments.*—I have on several occasions taken first mucoid discharge, and later, scrapings of corneal epithelium, from well-marked cases and introduced the material into the unaffected conjunctiva

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was seen, but this is sufficiently explained by the difficulties referred to in the text.

of the patient's other eye, afterwards moving the lids freely over the eyeball. The results were negative. Lately, also, on a few occasions I have abraded the corneal surface slightly to facilitate inoculation; but these patients were either not seen again, or the attempts are too recent for definite statements. I once introduced some of a four-days' agar culture of bacillus pyocyaneus, which had been grown directly from an affected cornea, into the healthy conjunctiva of a hospital attendant, afterwards rubbing the lids over the eyeball. In two days, besides a moderate degree of conjunctivitis, two small pustules had developed on the surface of the upper tarsus, and agar cultures from them gave a plentiful pure growth of bacillus pyocyaneus. The yellowish adherent contents were detached by swabbing with silver nitrate solution, leaving deep pits which afterwards extended a little superficially into small ulcers. These after a few days became connected by a band of fluorescin-staining surface, not ulcerated, covered each morning with membranous exudation. No silver nitrate had been used after the one application. Nearly six weeks later two spots, similar to those of punctate keratitis, developed on the cornea of this eye. Evidently there is something to be learnt as to the means of implantation of the encapsuled bacillus on the cornea. And as to the relation of the associated conjunctivitis, is it predisposing or secondary?

I have to thank Mr. Haffkine and Captain Lamb, I.M.S., for help and guidance in this work.

A PLEA FOR UNIFORMITY IN THE NOTATION OF THE AXES OF CYLINDERS AND IN THE TINTING OF SPECTACLES.[1]

By W. M. Beaumont, M.R.C.S., Bath.

The purpose of the present article is not to present an exhaustive treatise on the best method of registering the axis of cylinders: my plea is simply for uniformity. Ours is eminently a practical science, and we are told on first-rate authority that "Science is measurement." Yet, when we look at the astigmatic test-frames in our trial-cases, we find that in scarcely any two frames are the axial degrees marked alike. If we turn our attention to the ornamental representation of a spectacle-frame at the top of the optician's prescription papers, the same lack of uniformity exists in the halo of figures which surrounds the framework. We know what to expect when we are told that the axis of a lens is vertical or horizontal; but what is an angle of 60°? The opticians, if we may judge by their frames and prescription papers, are disagreed as to whether it means 60° from the horizontal from right to left, or from left to right; or, thirdly and fourthly, whether it is 60° from the vertical from right to left or from left to right. So great is the confusion that the axis which one calls 60° another calls 120°, and yet another 30°. Again, is the numbering to be the same for each eye, or is an axis of 60° in one eye to be parallel with, for instance, 120° in the other? To my mind it does not much matter what method of numbering we adopt, but I do think we should agree to a systematic one.

To turn now to another subject, my next complaint is with regard to the tinting of lenses and protectors. We order, it may be, "London fog," but some of us have not the advantage of knowing from practical experience what the exact shade of a London fog may be, and the fraudulent optician may, for aught we know, put us off with what may be only a mild Cheltenham fog, or some other colourable imitation. At present we order faintly-tinted, medium-tinted, or dark-tinted glasses; or they may be numbered from one to six, or lettered from A to F, according to the sweet will of the maker. Why cannot this be altered and a fixed standard be established?

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[1] Read in the Ophthalmology Section of the Meeting of the British Medical Association at Cheltenham, 1901.

In conclusion, what shall we say about the numbering of prisms? Shall we adopt Dr. Jackson's method of marking them according to the angle by which they deviate rays of light; or shall we follow Dr. Maddox and have them marked with metre angles and their fractions so as to correspond with the lenses in the trial-cases? These details may seem small matters, but big matters are the sum of small matters, and anything which tends to uniformity is surely worth considering. I beg to draw attention to the subject, and hope that those in authority may see their way to promote harmony, where, at present, discord prevails.

REVIEWS.

HOSCH (Basel). The Epithelium of the Anterior Capsule of the Lens. *v. Graefe's Archiv. für Ophthalmologie, lii.* 3.

The author draws attention to observations on the epithelium of the anterior capsule of the lens made and published by him twenty-six years ago. He then showed that between the cells of the simple epithelium prolongations of different lengths, either single or branching, are found, being analogous to the prickles found on the cells constituting the compound epithelial structure. Only two other observers took notice of this publication, viz., Schwalbe in his "Manual on the Anatomy of the Sensory Organs," and Barabaschew in his "Contribution to the Anatomy of the Lens."

The author therefore re-examined his old preparations, and made new ones which bore out his previous conclusions. The most instructive object proved to be flat portions of the anterior capsule (with adhering epithelium) treated with hæmatoxylin, especially when by good luck it happened that through pressure or by pulling, the capsule yielded without tearing so far only as to allow the individual cells to separate a little from each other. In such stretched portions the cells appear surrounded by prolongations of various shapes and lengths, some finger-shaped, some branched and intertwined with those of the neighbouring cells, so that it becomes impossible to say to which cell each process belongs.

Hosch interprets these prolongations as being analogous to the so-called intercellular bridges of the epithelial and endothelial cells, the equivalents of the prickles of the polygonal cells of the compound and also of the simple epithelium.

Their origin is due probably, not to secretion of the tissue cells or to coalescence of their walls, but to a metamorphosis of the cell-protoplasm itself.

In a postscript to this paper Leber, under whose auspices the work embodied in the article by Barabaschew, above referred to, had been carried out, emphasises the peculiarity of these cells, which, though already published in Barabaschew's article, seems also to have escaped the notice of subsequent investigators.

The lateral processes do not occupy the whole width of the cell but start sometimes in the upper, sometimes in the middle or the lower portion of the lateral cell wall. Seen from the surface of the capsule, the cell contours have a very varying appearance according to the depth to which the microscope is focussed; by the help of the micrometer screw this puzzling maze can, however, be easily unravelled; and still more conclusive are the images obtained from transverse sections of lenses stained with silver.

Leber thinks that the silver staining gives more lifelike pictures than the treatment with osmic acid, by which method swelling is produced. The silver staining shows the cells separated from each other by continuous sharply-outlined contours. This is rather contradictory of the suggestions of Hosch that these processes are to be regarded as intercellular bridges, or as portions of an intercellular coalescence.

K. G.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

MEETING, OCTOBER 17.

Mr. DAVID LITTLE (the new President) in the Chair.

THE following cases were shown :—

Persistent Double Keratitis.—Mr. R. Marcus Gunn. Patient, a man, stated that his eyes had been very sensitive to light as long as he could remember. When 8 years old they had been inflamed, and again when 14. He had never been able to read much since this attack, and his sight had been very defective. He had suffered from acne of the face when 16 to 21 years of age; scars of this still remain. When first seen, vision with correcting glass for myopic astigmatism was $\frac{20}{40}$ in each eye, then there was a corneal haze on both eyes, worse in the centre, which was occupied by rounded elevated dots; these, by oblique illumination, gave an appearance as though the cornea were studded with small grey spots, equidistant from one another, the opacities evidently epithelial, the larger ones being in the centre. Seen again twelve years later, the vision was much worse ($\frac{10}{200}$ and J. 12) since the cornea was now much more opaque. Patient is one of a family of ten, four of whom seem, from the history of their condition, to have had a similar affection of the eyes. Both corneæ show a diffuse haze, with greyish and more opaque spots scattered in the haze. No vessels to be seen, but grey lines.

A Deep-seated Infective Conjunctivitis of an Unusual Character.—Mr. Lindsay Johnson. The left eye only of the patient was affected, a man engaged in electric cable work. Both the ocular and the palpebral conjunctivæ were inflamed and œdematous.

that of the lower lid especially, which was greatly swollen, and under the œdema stood out a glistening line looking like a longitudinal scar. The cornea was clear. No iritis was present, or any ophthalmoscopic change, and no trachoma.

The chief points of interest were: (1) The long duration of the disease, nearly nine months without apparent change: (2) The absolute inertness of all lotions, drops and internal medication, on the appearance and activity of the inflammation of the conjunctiva: (3) The large number and activity of streptococci and staphylococci, chiefly in the deeper tissue: (4) The slow but gradually increasing failure of vision, unaccompanied by ophthalmoscopic change or corneal trouble to account for it: and (5) The presence of pain on pressure along the orbital ridge and the superior maxilla, but no direct evidence of necrosis or periostitis.

Congenital Distichiasis.—Mr. Sydney Stephenson. The patient was a girl aged 4, whose eyes had always been weak and inclined to water in the light. In both lower lids there was obvious trichiasis. In the right eye at both inner and outer ends of the lower lid were to be seen several short misdirected cilia arising from the intermarginal space behind the origin of the lashes: in the upper lid, chiefly along its outer third, a similar condition was present.

In the left eye scattered cilia, which turned in upon the globe, were noticed arising from the intermarginal space of the lower lid along its entire length: the upper lid presents a similar deformity over its outer third. There was no history of blepharitis or trachoma, and no signs of either to account for the condition. The history and appearance of the case and of the double row of cilia, together with the complete absence of the usual causes of trichiasis, combine to make it practically certain that this is a congenital deformity. The case also differed from those described by Mr. Stephenson, in the *Transactions of the Ophthalmological Society*, vol. xiv. (1894), in which the lashes were displaced by a fold of skin derived from the inner commissure running horizontally outwards anterior to and parallel with the intermarginal space, probably due to imperfect development of the tarsal plate of the lower lid.

Mooren's Rodent Ulcer, involving the whole surface of each Cornea.—Mr. E. T. Collins. The cornea in this case showed a deep opacity with general diffuse haziness, through which, however, the iris and an operative coloboma could be clearly seen. On examination of the cornea with a + 20 D. lens, a curious plexus of lines became visible, looking like a system of empty glass tubes, numerous in the centre of the cornea but fewer at the periphery, all blood-filled vessels having disappeared from the cornea. The patient, a man, had been previously shown before the Society by Mr. E. C. Fischer, on July 5, 1895, the notes recorded in the *Transactions*, vol. xv., being to the following effect:—Marginal ulceration of both corneæ, associated with bullæ, the right eye affected five weeks, the left three weeks, but no history to account for the onset; no specific history. A large crescentic ulcer was then present at both the outer and inner margins of each cornea, the ulcers bounded by thin grey overhanging edges. The central clear portion of the cornea was affected by four successive crops of minute bullæ; no treatment seemed of any avail, so the cautery was tried, which on two occasions stopped the spreading tendency of the ulcers. After the inflammatory symptoms had subsided, leaving a central corneal opacity but clearer margins, iridectomies were performed, first on the left, then on the right. The vision in the right eye before iridectomy was finger counting at 2 feet, in the left at 4 feet; the operation in each case increased the vision to $\frac{3}{60}$ and J. 15. The opacities have somewhat decreased since 1896.

Choroidal Angiosclerosis, with Pigmentary Degeneration.—Mr. N. B. Harman reported two cases.

Case 1.—Woman, aged 57, with doubtful specific history, on whom double cataract extraction had been performed without improvement of vision. Both fundi were of a pale brown tint; the choroidal vessels well mapped out as glistening white lines; discs pale; retinal vessels small; much scattered pigment grouped in "bone-corpuscle" branched masses. Vision = perception of light.

Case 2.—Woman, aged 59. In right fundus is seen a large central patch of choroidal degeneration, oval in shape, and bounded by masses of pigment; within the pigment the patch is pale pink in colour, with choroidal vessels showing white; these are thick walled, but with the central blood stream visible; the retinal vessels normal. Scattered over the rest of the fundus are other patches of choroidal atrophy, some bounded by pigment, others not, but having a grey stippled appearance. Vision R. E. = $\frac{6}{60}$ and J. 14. Field shows an annular scotoma. There is a history of cardiac disease and albuminuria.

Both these cases he supposed to be due to choroidal disturbance, depending on a sclerosed condition of the choriocapillaris.

Case of Paresis of the Third Nerve showing peculiar features.—Mr. N. B. Harman. The patient, a man aged 35, who contracted syphilis five years ago, now shows signs of third nerve paresis in the left eye, ptosis, defective ocular movements, inactivity, and slight dilatation of pupil. Vision $\frac{6}{9}$.

The curious feature in the case was the see-saw action of the upper lids; on raising the left lid by means of the finger, the right immediately droops, and is again elevated on dropping the left lid into its position of partial ptosis. This may be repeated indefinitely with the same result. This phenomenon is explained by Mr. Harman as being due to the partial crossing of the fibres of the third nerve nuclei; the nucleus of the left side being affected, on an extra impulse being liberated from the right nucleus in the effort to lift the left lid through the crossed fibres, an extra elevation of the right lid takes place, but when one mechanically assists the left lid to rise the effort is relaxed, and the right droops to its normal level again.

Congenital patch of Pigmentation in the Fundus Oculi.—Mr. G. W. Roll. This patient, a woman aged 27, was of very dark complexion, showing several deeply pigmented skin moles on face and elsewhere; she also suffered from exophthalmic goitre, but the thyroid was not enlarged. The pigmented portion of the fundus has the same appearance as the fundus in the coloured races.

In the right fundus, above and to the nasal side of the disc, a circular black pigment patch about three times the size of the optic disc is seen with an even margin separating it from the rest of the fundus. Vision of each eye $\frac{6}{6}$.

Chancre of the Lid.—Mr. A. Q. Silcock. This primary syphilitic sore on the right upper lid of an infant eight weeks old, had been noticed two weeks before medical advice was sought, the mother supposing it to be a stye; but she thought there had been a scratch in this position a week before the swelling appeared. The sore had the characteristic appearance of a primary sore and felt like one to the touch; the glands were indurated. The mother had a specific rash on her limbs and upper part of back and chest, and a few scaly patches on her hands, first noticed ten days previously.

Sclero-Corneal Dermoids.—Mr. L. V. Cargill. These were present in a young girl together with corneal nebulæ. Each eye showed a glistening white rounded swelling, chiefly scleral, but encroaching a few millimetres upon the lower outer quadrant of the cornea; on its summit were three or four hairs the length of the normal eye-lashes. Under the upper lids two small swellings were also present, perhaps similar in origin. In no other member of the family was there anything of a like nature.

Rodent Ulcer of the Cornea in a Child.—Mr. S. Johnson Taylor. This was the only example he had encountered in twelve years of special practice. The ulcer, very vascular, ran completely across the upper third of the left cornea, in spite of all treatment, the edge being sinuous and much undermined, not accompanied by hypopyon or iritis, or by any perforation of the cornea, and was only allayed by the application of pure carbolic acid and scraping. The appearances were quite typical of Mooren's ulcer.

THE PRESIDENTIAL ADDRESS

was delivered by Mr. David Little, who chose as his subject: *Some Clinical Experiences of Primary Chronic Glaucoma and the value of Iridectomy.*—After acknowledging the honour conferred on him by his election as President, and through him on the provincial members of the Society, the President proceeded to review the methods of treatment of primary chronic glaucoma, strongly advocating early iridectomy during premonitory symptoms. He considered that while some operators favoured sclerotomy, and others iridectomy, nevertheless there was a very near approach towards unanimity amongst ophthalmic surgeons, in that they all agreed that the essential point in treatment of the glaucomatous eye was the formation of a suitable incision well back in the corneo-scleral junction, in order to re-establish a channel for the escape of pent-up intraocular fluid. With this as the main point before us he thought it might truly be said that von Graefe's discovery as to the value of iridectomy in glaucoma, though made more than forty years ago, remains unshaken in theory and in practice up to the present day. Though myotics are largely used he looks upon them as merely temporary and palliative adjuncts which do not, and cannot, cure; in his opinion glaucoma essentially calls for operative interference for its arrest and cure, for which purpose iridectomy is the only reliable and permanent therapeutic agent. He considers the great additions to our knowledge of glaucoma, its etiology and pathology, are in a great measure due to the original researches and contributions of Brailey, Priestley Smith, Nettleship, and Collins. He had given sclerotomy a fair trial in cases of chronic glaucoma; out of forty such cases he had treated those in which the anterior chamber was not too shallow by making long incisions well back in the periphery, according to De Wecker's method, leaving a bridge of sclera and cornea, and in some cases of cornea only. He had obtained some permanently good results, in some the tension rose again after a short period, in others trouble arose from prolapse of iris, and on the whole he was not satisfied with the operation, mainly because of iris complications and early recurrence of tension, and now in all cases he performs iridectomy as the primary operation, reserving sclerotomy as the secondary operation should the iridectomy fail. In such cases he prefers to make an incision in the coloboma rather than perform a second iridectomy on the opposite side of cornea or at any other part of the eye.

He considered that still more information is needed as to the permanent effects of iridectomy with regard to the amount of vision retained after the operation, many years after. With this end in view, he collected reports of 67 mixed cases, some probably of simple glaucoma, others of the chronic variety; out of these 11 had died, 19 were untraceable, and 37 were traced. Out of these 37 cases, 10 had become blind, one from atrophy of the globe, another from recurrence of the glaucoma, the remaining 8 patients were blind from atrophy of the optic nerve, the tension in these 8 remaining cases being normal. In 4 of the other 27 cases the vision had considerably deteriorated, and they were slowly going down hill from atrophy of the nerve; in the still remaining 23 cases the vision in some was better than at the time of the operation, in most it was about the same, in a few others a little worse, but upon the whole they appeared in a stationary but satisfactory condition. Twenty-three cases out of 37, therefore, or 62 per cent., have held their ground seven to twelve or thirteen years after the operation, and in all of them the tension was normal. At the time of the operation 3 of the cases had vision = J. 20, which they retained after nine or ten years; another, with vision = J. 19 and the field contracted to a mere slit on the outer side, also remained the same after several years. He strongly recommended iridectomy even in cases with vision only = J. 20, since this amount of vision, if it can be retained, proves very useful and enables the patient to go about. Such cases should *not* be looked upon as hopeless and consequently not operated on. Personally he had no doubt as to the efficacy of iridectomy in permanently reducing the tension, and if patients subsequently become blind it seldom was from a recurrence of glaucoma, but from progressive atrophy of the nerve. In support of this view he mentioned another case in which vision remained $\frac{6}{6}$, twenty-four years after iridectomy had been performed, and though the field continued to contract during all these years the tension remained normal. One case of acute glaucoma which he related, in which the vision in twelve hours was reduced to counting fingers, after an iridectomy performed under difficulties at midnight, retained practically normal vision for twenty-seven years. As regards simple glaucoma, he could not imagine any case of glaucoma without there being increased tension ; in some of the cases seen early he had difficulty in diagnosing glaucoma from real atrophy of the nerve, but he considered that in the so-called simple glaucoma the rise of tension usually develops suddenly later on, and blindness then follows rapidly. Thus these cases are not so slow in development as is usually supposed ; in all of them he advised early iridectomy, even when the tension was normal. He stated he had never seen a case with much contracted fields in which the vision went altogether directly after, and as a result of, the operation. He usually operated with the keratome in preference to the Graefe knife, and his custom was to make a long incision far back. With reference to the question of operation during the premonitory stages, he quoted von Graefe, to agree with him completely, stating that he had never regretted operating in the premonitory stage, and that he strongly advised it, concluding his interesting address with the words : " Looking back over the whole of my experience, my confidence in iridectomy is increased rather than diminished, and I would give to that operation the widest field in the treatment of chronic glaucoma."

Friday, November 8.

The President, Mr. DAVID LITTLE, in the Chair.

CARD SPECIMEN.

Sections of Orbital Tumour. Endothelioma (?) *Adeno-sarcoma* (?) Shown by Dr. A. Hugh Thompson.

The sections showed (1) a fibrous capsule, which in places is invaded by cells ; (2) tubular and alveolar spaces lined with a double row of cells, the cells being connected by protoplasmic processes ; (3) a groundwork of fibro-cellular tissue. Many of the spaces in the growth contained colloid material, but no enlargement of the thyroid was apparent. The tumour had been removed from the left orbit of a female patient aged 28, in whom the eyeball had been proptosed for one year. Potassium iodide had been given, but with no good result. The vision was unaffected. The lachrymal gland was in front of, and in contact with, the growth at the time of its removal.

Mr. Thompson referred to the report of similar conditions in the *Archives of Ophthalmology*, vol. ii., p. 62, to a case reported by Lawford and Collins in the *Ophthalmic Hospital Reports*, vol. xiii., and to the *Transactions of the Ophthalmological Society*, vol. ii.

PATIENTS.

(1) *Tumour apparently growing from the Optic Disc.*—Mr. R. W. Doyne. The left eye was practically blind, only having peripheral vision. The left optic disc was entirely hidden by a bulging retinal detachment occupying the outer half of the retina and extending both above and below the disc. Behind the detachment there appeared to be some solid mass with hæmorrhages over it. The apex of the mass could be best seen with a lens of + 15 D. behind the ophthalmoscope. The patient, a woman, aged 36, six months pregnant, had suffered from giddiness five months ago, but had no other symptoms; she had had no miscarriages and there was no other evidence of syphilis. Under treatment with mercury and potassium iodide some absorption of the hæmorrhages over the mass had taken place, but no other improvement; the hæmorrhages were at first on the summit of the growth, now they are more to the side. The V. at present in the right eye is normal, with the left she counts fingers only, and that peripherally.

(2) *Syphilitic Ulcer of Upper Eyelid.*—Mr. Norman MacLehose. The patient, a man, stated that his right upper eyelid had been sore and inflamed for six weeks; his left eyeball had been removed three years previously on account of an accident. About the middle of the right upper lid there is a small ulcerated area in the margin of the lid, having a slightly indurated base; the adjacent skin was red and inflamed. This ulceration began as a small boil near to the inner canthus, involving the margin of the lid; it then spread outwards, and at the present time two-thirds of the lid margin are ulcerated, the inner part more deeply than the outer. There was no enlargement of the pre-auricular gland; the cornea was nebulous centrally. The syphilitic history was indefinite but suspicious, so indefinite that the case was at first thought to be one of rodent ulcer and not of specific ulceration; the patient, however, was put upon anti-specific treatment for ten days as there was room for doubt, but without any improvement in the condition.

Set of three instruments used by a Native Indian Oculist.—Shown by Mr. Frost for Major H. E. Drake-Brockman, I.M.S. The set consisted of: (1) Sharp hook for picking up a pterygium prior to its excision with scissors; (2) Blunt hook used as an eyelid retractor; (3) Knife used for blood-letting from the forehead for headache. The instruments were all made of rough iron; each was in one piece, and there appeared to have been no attempt made to give the instruments a smooth polish. These three help towards the completion of the set in the possession of the Society.

PAPERS.

(1) *Chronic Serpiginous Ulcer of Cornea* (*Mooren's Ulcer*).—By Mr. E. Nettleship. The author prefaced his paper by stating that he meant the chronic serpiginous ulcer described by the Germans under the name of "ulcus rodens." He stated that on a careful examination of the literature on the subject, the first case he had been able to find was one described by Sir William Bowman in "Parts concerned in the Operations on the Eye," 1849 (Case F., page 112), as one of intractable ulcer of the cornea, perforating at one point and afterwards slowly destroying the whole anterior surface. Mackenzie also described the condition (4th edition, 1854, page 631); but the credit of discovering it as a clinical species, and of clearly describing it and distinguishing it from the common hypopyon ulcer, is due to Mooren (*Ophthalmiatrische Beobachtungen*, 1867, page 107; *Ophthalmologische Mittheilungen aus dem Jahre*, 1873, page 35), who published cases in 1867 and 1873.

Mr. Nettleship considers that the term "rodent" should not be used for this condition at all, but should be employed strictly to designate a particular form of epithelioma of the skin—that is its usual meaning. Mooren's ulcer is rare, intractable, and has no known cause. He gave the total number of published cases as about fifty-nine, and some twelve cases of the author's own. The first microscopical examination of a case was made by Mr. Lawford of an eye excised by Mr. Tweedy, at Moorfields, in 1889; this case was supposed to have some of the characters, both clinical and histological, of epithelioma. He stated that the very commencement of Mooren's ulcer was very seldom seen. In certain cases it has been observed to begin as a narrow crescent of infiltration, or perhaps as an excoriation of the epithelium, just within the limbus of the cornea and occupying only a small part of the circumference. Soon this focus ulcerates, and the ulceration thenceforward spreads both in length along the border and in breadth towards the centre of the cornea. Unless checked, it invades the whole area, leaving the cornea thinned, scarred, and semi-opaque. Sometimes a second ulcer forms at another part of the circumference, and the two eventually join. The ulceration never attacks either the conjunctiva or the sclerotic, nor is there any thickening or deposit anywhere. Iritis is common, but perforation and hypopyon are rare. The cornea retains its normal curve and the deeper parts usually remain sound, so that the vision is proportionate to the amount of clear cornea opposite the pupil. Sometimes a series of small secondary ulcers form on the already healed scar, which may lead to protrusions and even to perforation. The advancing edge of the ulceration forms a narrow, sinuous, whitish band, level with the healthy cornea, the two ends of which are usually in advance of the centre, so that the diseased surface at this stage is roughly crescentic or semi-lunar; this narrow opaque band consists of the line of active disease overhung and obscured by a lip of half dead tissue with its epithelium, beyond which the cornea is usually clear and healthy. The ulcer may be stationary for days or months, the ulcerated part healing, then again breaking down, giving rise to a fresh extension of the ulcer. The healing process almost keeps pace with the ulceration, so that the part only which is near the advancing border is actually ulcerated, the rest of the surface being more or less healed and covered by epithelium, beneath which blood-vessels pass across from the scleral border. Pain, congestion, and photophobia are prominent symptoms, the pain being very severe when fresh ulcerations form. Usually when the last clear portion of cornea has succumbed, pain and irritation cease.

In the course of months slight improvement of vision takes place as the leucomatous scar becomes less opaque. The duration of the disease varies from two months to a year; from four to twelve months seems to be the most usual period, for chronicity is one of the chief attributes of Mooren's ulcer. The essential cause of this disease is unknown, for though its essential features and course point strongly to infection, no peculiar form of micro-organism has hitherto been found either by the microscope or by cultivation, although several cases have been examined.[1] Neither gout, malaria, syphilis, diabetes, nor renal disease can be blamed. Several cases have occurred in the well-to-do. Men are affected oftener than women, and the attacks usually begin in the winter. It is a disease of adults between 23 and 71 years of age, the patient in the majority of cases being over 40. Several old persons have quite recovered, while several younger patients have done very badly. The ulceration begins at the border of the cornea in three-fourths of all the cases, at some part of the margin which is exposed when the lids are open; if not there, then at the upper margin, and Mr. Nettleship considers that the feebleness of the terminal circulation in the conjunctival vessel at the limbus is probably one of the factors in causing such changes. It usually spreads only in the anterior layers, and the cornea affected by Mooren's ulcer is less sensitive than in health. It attacks both eyes in more than one-fourth of all the cases, the first point attacked in each eye being symmetrical. In 11 of the 16 double cases universal leucoma of both eyes was the result, while in 43 single cases only 17 (less than half) went to the bad. The author counts no case as one of "Mooren's ulcer" which has lasted less than two months. He considers that cases of severe Ring-Ulcer lasting a long time may be really Mooren's ulcer, and also that Fuchs' Catarrhal Ulcer, the chronic peripheral Furrow Keratitis of Schmidt-Rimpler, Fuchs' Keratitis Marginalis Superficialis, and the recently described Marginal Atrophy, as well as Fuchs' Keratitis Marginalis Profunda are all Mooren's disease. The author considers that the most important point in the treatment is first to lay bare the ulcer to be cauterised, then to cauterise deeply, even at the cost of spoiling a little good tissue beyond the actual margin.

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[1] Andrade (*Annali di Ottalmologia*, xxix., 1900) described a micro-organism which he believed to be the cause. On this point and others connected with the disease, see OPHTHALMIC REVIEW, 1900, p. 103, and 1901, p. 166.—[ED.]

(2) *Keratitis in the New-born.*—Dr. W. Ernest Thomson related three cases. In each, delivery of the infant had been instrumental, and in each an almost identical form of corneal opacity had resulted.

Case 1.—Male child, weight 9½ lbs., 23 ins. long. Forceps had been used and much difficulty experienced. An opacity of the right cornea was noticed immediately after birth, the opacity so marked that the pupil was only seen with difficulty; the opacity was dense in the centre, and the surface lustre of the cornea lost; the haze was superficial, and apparently composed of minute, closely-packed dots; no vessels were to be seen in the cornea. Three months later the haze had almost disappeared, and in its place a white linear scar was left, running vertically across the cornea, with a second linear scar parallel with the first, but slightly to one side.

Case 2.—Female child, weight 7 lbs., 19 ins. long. Forceps had been used and difficulty experienced. In this case after birth the frontal bone was depressed and the left eye bulged forwards, with the pupil dilated and not showing the reflex. The right cornea was opaque all over. The next day the left conjunctival sac was filled with a large blood-clot. On clearing this away the cornea was found to be quite opaque. The right cornea, four days later, was cloudy all over, this opacity being composed of numerous dots closely packed together ; the surface lustre was lost. No vessels were to be seen in the cornea, but a sub-conjunctival ecchymosis was present. Eight days later the cornea was slightly hazy and showed a small linear scar, running in a vertical direction, as in the first case. The right cornea had become much denser, so that the pupil could scarcely be made out.

Case 3.—A difficult labour : forceps used. After birth the left eye of the infant was seen to be much contused and swollen, with blood suffused into the conjunctiva. It was not till three weeks after birth that the eye could be thoroughly examined, but a corneal opacity was noticed. Later the opacity had become less dense, and when this cleared up somewhat a linear scar was made out similar to those in the previous cases, but not quite vertical in direction, rather oblique, and leaving about 1 mm. of cornea free at either end.

Mr. Thomson considers that a reasonable explanation of these appearances is to be found in the supposition that during delivery with forceps the eyeball is forced against the nasal wall of the orbit, consequently the cornea becomes buckled ; a disturbance of the corneal lymph circulation thus takes place, which is greatest at the line of buckling and leaves a permanent scar in that situation. He thinks that some cases caused in this way might readily be supposed to be cases of " Congenital Opacity of the Cornea."

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The Ophthalmic review

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